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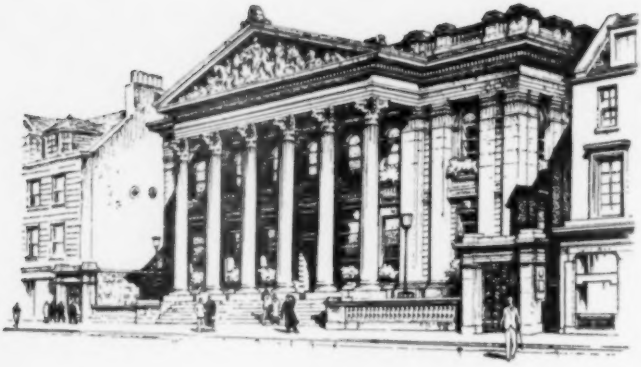

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THE SCOTTISH
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THE GERMAN REFUGEE PROBLEM: TEN YEARS RETROSPECT

Roy E. H. Mellor

Based on a lecture delivered at the Royal Scottish Geographical Society's 'New Developments' Meeting on the 15th of March 1956

The flight or expulsion of Germans from eastern and south-eastern Europe during the closing stages of the Second World War brought the destruction of a centuries-long German colonisation. The movement had begun before the war with the transfer by the Nazis of Germans back to the Reich from the Baltic countries and eastern marchlands. The expulsion of Germans from Poland, Czechoslovakia and other parts of eastern Europe as a means of solving difficult minority problems, an inheritance from 1919, had been discussed by Allied statesmen early in the war and took final form in the Potsdam Agreement. Under Article XIII of the Agreement there was to be a *humane transfer* of Germans, numbering 6·65 million, from Poland, Czechoslovakia and Hungary, who were to be distributed between the occupation zones on an agreed plan. Before the plan could be put into full operation there had been, however, a mass flight of Germans before the advancing Red Army and those who remained were quickly expelled by the first competent local authority. Several countries not mentioned in the Potsdam Agreement also seized the opportunity to rid themselves of unwanted Germans. About sixteen million Germans were affected, of whom three million are still unaccounted for and another million are estimated to be living in their old homes. In the Soviet Zone there are about 3·5 million refugees (known there as *Umsiedler*); but the majority live in Western Germany and number about 8·5 million. With them are also 2·3 million people who have fled from the Soviet Zone since 1945. Together they form over 21 per cent of the total West German population.

It is now over ten years since these homeless and then hopeless people began to arrive in the country. Despite immense initial and

still formidable difficulties, a great deal has been achieved in their successful integration. At the same time they have been a heavy burden on the young West German state but a valuable and stimulating addition to German life. The refugees form a complete cross-section of German society, containing a considerable proportion of old and unproductive members. It must be remembered that the bulk of this movement took place within two years into a disrupted country, only a little over half its pre-war area and which had lost some 10 per cent of its heavy industry and 20 per cent of its agricultural area by annexation to Poland and the U.S.S.R. Air bombardment and ground fighting destroyed or severely damaged large numbers of industrial installations, which had also suffered from dismantling for reparations. Divided into four semi-autonomous occupation zones, the country was without a centralised authority to control the flow of refugees, who at times poured in at over 50,000 per day. The special machinery envisaged to deal with the movement never really materialised, while the organisation established by the Nazi authorities before the capitulation had collapsed under the weight of numbers.

There have been three stages in the integration of the refugees. The first was the period of the greatest inflow of the refugees and lasted until the currency reform of 1948. Apart from giving the refugees food and shelter, little could be done under conditions of inflation and restrictive Allied controls to give any secure employment or hope for the future. The second period, from the currency reform to the outbreak of the war in Korea, was one of difficult adjustment to the new monetary economy, marked by severe unemployment and hardship for most refugees in the early period. It gave the refugees, however, a first chance to find permanent and economically rewarding jobs and to start to rebuild their shattered lives. The third period, which has lasted since 1950, has been one of increased tempo in the absorption of refugees into everyday life and has been helped by the rapid economic recovery of Western Germany, to which the refugees have made no small contribution.

The first statistical indication of the magnitude of the refugee movement was given by the four-power census of 1946, though the stream of newcomers at that time was still continuing. Despite heavy war losses and a sharp fall in the birth-rate after 1943, the population in the 1946 area of Germany (only 53 per cent of 1939 area) had risen by 10 per cent. In the three western zones comprising the Federal Republic, population had risen by 4·3 million, an increase of 13·4 per cent ; and the influx of 6·8 million refugees had more than offset a decline in local population as a result of war losses and lower birth-rate. By 1955 the population of Western Germany reached 49·8 million, including 10·9 million refugees, an increase of 26 per cent over 1939. The qualitative effect of refugees on population has been more significant than their influence on numbers. It was at first believed that the refugees were mostly " old people, women and children " ; but this erroneous belief was corrected by the 1946 census which showed the refugees to have an age and sex structure no more unhealthy than that of the non-refugee population. The detailed census of 1950 in

Western Germany confirmed these findings. In the demographically and economically important age groups between 20 and 40, the refugees show a greater percentage of their numbers than the local population, while a smaller proportion of refugees than local people is over 65. The pattern varies between different groups of refugees : for example, refugees from the Soviet Zone show a particularly high proportion of their numbers in the age groups between 17 and 35. The greater proportion of young and active people in the refugee population give them a social and economic advantage over local people. Although the refugees at first showed a much lower birth-rate than local people, their rate (10 per 1,000) since 1950 has exceeded that of non-refugees (6 per 1,000)[1] ; indeed, 1950 was the first post-war year when population growth was the outcome of natural increase and not large-scale migration. There is now evidence to indicate that the pattern of refugee demographic development (reproduction rates, size of family, etc) is still that of the refugees ' homelands and not the pattern of their new homes.[2]

It is not surprising that a very uneven distribution of refugees occurred in the unorganised flow into Western Germany (Fig. 1). Refugees naturally sought asylum in districts little affected by war where shelter was readily available, which meant they mostly went to remoter country districts not already occupied by large numbers of evacuees from bombed cities. Small towns and residential districts around principal cities were already filled by the evacuees, while there was little chance of finding accommodation in the heavily damaged industrial towns. Refugees were discouraged from settling in many towns because municipal authorities found it hard enough to support even the existing population. There is a close correspondence between the distribution of refugees and the principal areas of population growth, illustrated in Figures 1 and 2. Particularly noticeable in Figure 2 is the great growth in the Baltic littoral, into which crowded the remnants of the North German armies, evacuees from Hamburg and Bremen, and refugees coming by sea from Pomerania, East Prussia and Danzig. There was also considerable growth in the remoter parts of the Lüneburg Heath, the poor country of the Teufelsmoor and the sandy *geestland*, as well as eastern Friesland, eastern Bavaria and parts of Hessen, where refugees formed a significant proportion of the population. There is again a close correspondence between the districts with low percentages of refugees in the population and those which lost population or remained almost stagnant between 1939 and 1946 : these form a belt along the western frontier from the Rhine near Wesel through the French Zone to the Swiss frontier and with few exceptions correspond to the larger towns, although they lie outside the main frontier belt. Refugees were debarred from entering the French Zone. The French, as non-signatories of the Potsdam Agreement, refused to accept any refugees, although some 95,000 had managed to settle in their zone by 1946.[3]

Such an uneven and unhappy distribution could not represent a permanent state of affairs, unless there were to be a complete revolution in the German economy to provide employment in the countryside for

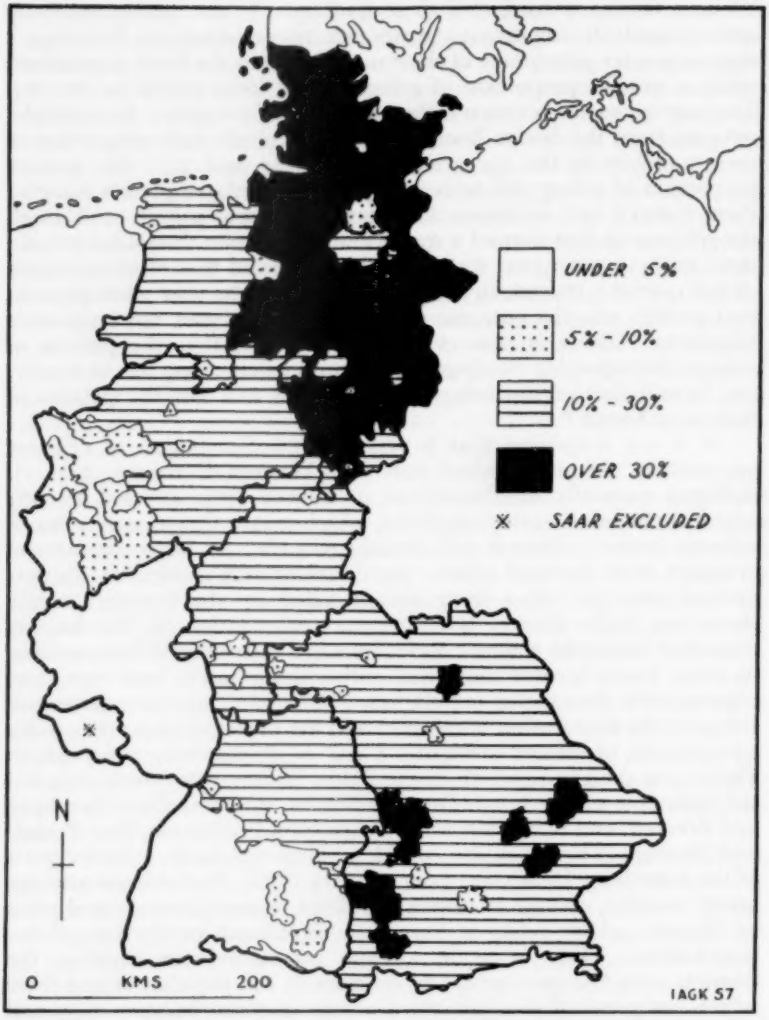

Fig. 1. Distribution of refugees, 1946, in the German Federal Republic.

people who before flight had been dominantly town dwellers. The 1950 census and later statistics on migration within Western Germany show a movement from country to town, composed chiefly of returning evacuees and refugees seeking employment. Growth between 1946 and 1950 was predominantly in the larger towns and in the western frontier belt (Fig. 3). Small but significant decline in population was a feature of many of the crowded districts of Bavaria and Schleswig-

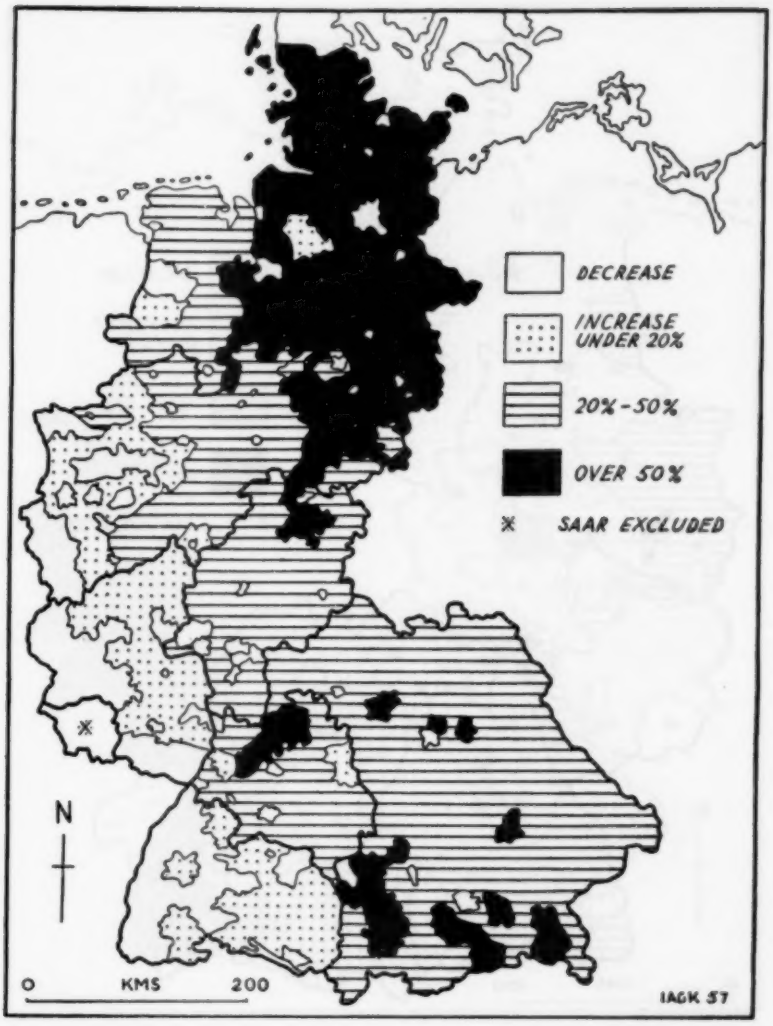

Fig. 2. Population change, 1939-46, in the German Federal Republic.

Holstein, and the change had in most instances been accompanied by a fall in the proportion of refugees in the total population (Fig. 4). The principal increases in the proportions of refugees had been in districts of the French Zone, particularly Rheinland-Pfalz and the South-West State and in nearly all the larger cities (Fig. 5).[4] There was a much fairer distribution of the total refugee population in relation to the distribution of the total population, both refugee and local, between

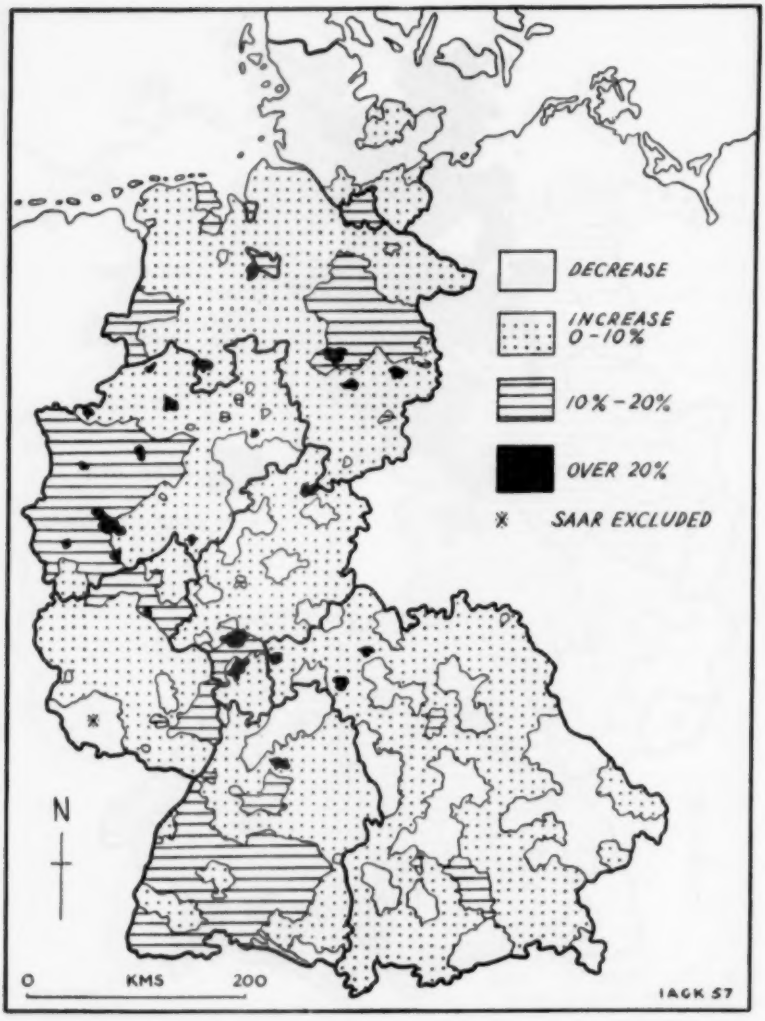

Fig. 3. Population change, 1946-50, in the German Federal Republic.

the Länder in 1950 than in 1946, a feature marked even more clearly in 1955.

Refugee integration has thus taken place within this uneven and shifting pattern. The shifts have been an important part of the integration process. Arriving without material wealth, the refugees have acutely felt their reduced social status, which has been emphasised by the limited prospects of advancement in the country districts in

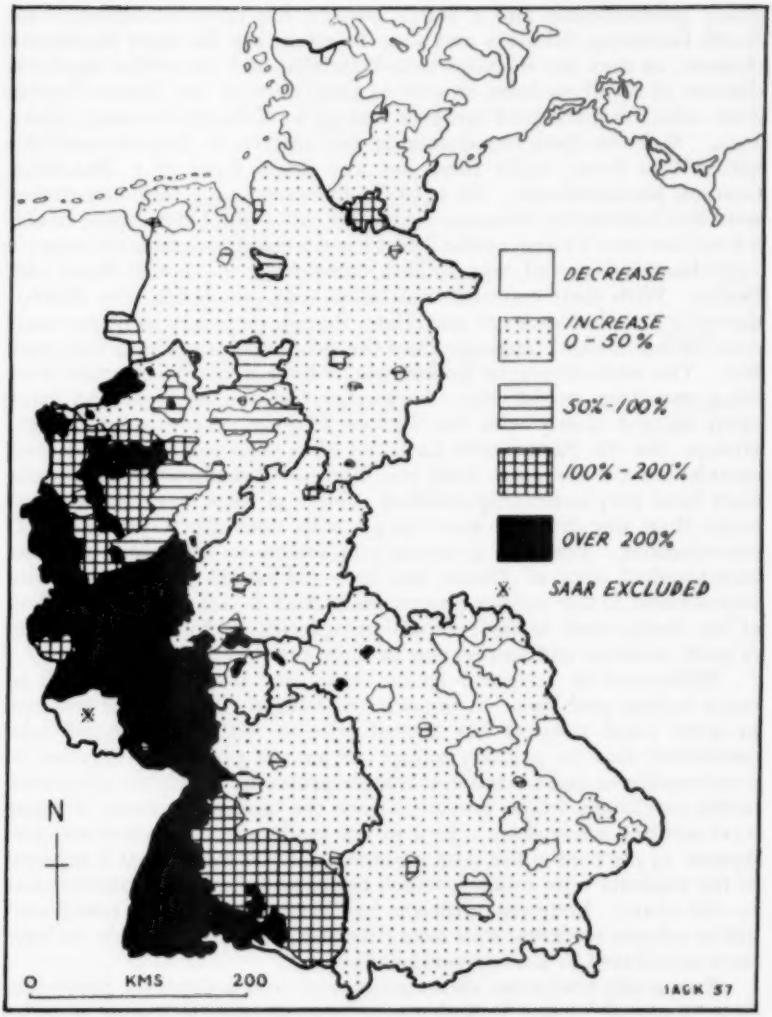

Fig. 4. Change in refugee population, 1946-50, in the German Federal Republic.

which most of them settled. The task of trying to establish refugees in their correct social status has meant providing economically rewarding jobs, a measure of security of tenure, suitable housing, and ensuring that the equality between refugees and non-refugees has been practised. The work has been complicated by the many different backgrounds from which the refugees have come. In any German *Kreis* it is possible to find refugees from several different homelands, though usually one

group predominates and a rough pattern has been established. In North Germany, Silesians and East Prussians are the most important element, as they are in Nordrhein-Westfalen and the richer southern districts of Niedersachsen, as well as most parts of the former French Zone which has accepted refugees, mostly from North Germany, since 1949. Sudeten Germans dominate the pattern in Bavaria and the South-West State, while there are also small areas of a Danubian German predominance. In 1950, at the census, 4·4 million refugees were Reichsdeutsche from annexed lands east of the Oder-Neisse rivers, 3·6 million were Volksdeutsche from German colonies outside Germany's 1938 boundaries, and 1·55 million came from the Soviet Zone and Berlin. With their constant association with the Reich, the Reichsdeutsche have been easy to assimilate, though they vary in many small ways of custom and language from the people among whom they now live. The more divergent Volksdeutsche have in many instances lived for generations outside the two former German empires and have often merged closely with the Slav or Magyar people around them. Groups like the *Bugholländer* have not even retained a pure German speech and the Germans from the Ukraine and elsewhere in Russia have been very noticeably russified. Some of them have experienced more than one transfer since 1939, with consequent psychological repercussions. Few feel a strong attachment to *Deutschtum* and the metaphysical idea of *Heimat* has little meaning. Restlessness and hopelessness in the smaller groups arises from a lack of understanding of the background of their expulsion, transfer or flight and a feeling of gross isolation and strangeness in their new homes.

Differences in 'cultural levels' have not been great enough to cause serious problems. A majority of refugee children and teachers in some rural districts has caused friction with local people who considered that the primary school curriculum gave too little place to local conditions and too much to refugee problems. In higher education, under conditions which prevailed since the currency reform, refugees have not had a fair share : in a survey made at a time when refugees formed 15 per cent of the total population it was shown that 8 per cent of the students were refugee, which might well have sad consequences in ten years. Frequent criticism has been made of the insufficient aid to refugee students, who seem, like refugees in other fields, to have been stimulated to above average effort.

Frequently bred in an alien environment and without the protection of a 'national' state, Volksdeutsche have developed a sense of independence and yet corporate feeling which has brought a new atmosphere to German life. They have been active in the formation of refugee organisations such as the regional associations, though it is claimed by some authorities that under half the refugees belong to such bodies. It is regrettable in the political field that refugees have sometimes supported or have fallen prey to less desirable parties which seldom mirror true refugee sentiment. Refugees have reached some of the highest posts in the Federal Government.

There has been a general and natural tendency for refugees to gravitate towards districts where their own religious confession pre-

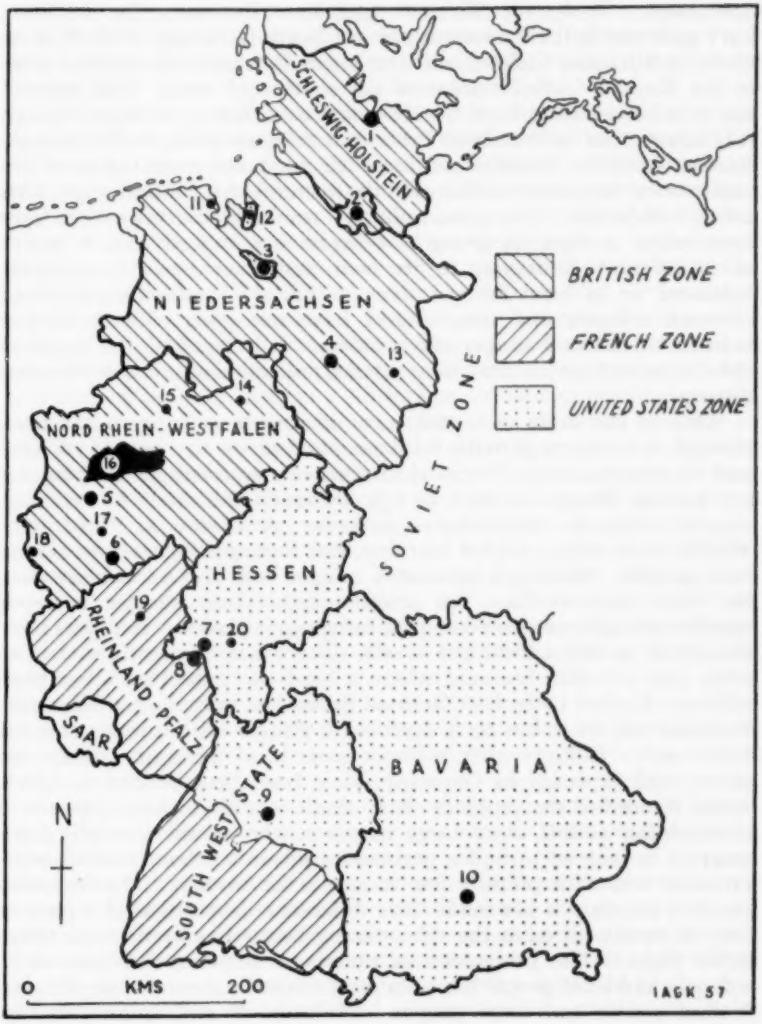

Fig. 5. Administrative divisions and towns of the German Federal Republic.

Administrative Divisions: Schleswig-Holstein: Niedersachsen: Nordrhein-Westfalen: Hessen: Rheinland-Pfalz: Saar: South-West State: Bavaria: Soviet Zone.

Large Towns (land capitals): 1. Keil: 2. Hamburg: 3. Bremen: 4. Hanover: 5. Düsseldorf: 6. Bonn (*capital of Federal Republic*): 7. Weisbaden: 8. Mainz: 9. Stuttgart: 10. Munich.

Other Towns: 11. Wilhelmshaven: 12. Bremerhaven: 13. Brunswick: 14. Bielefeld: 15. Münster: 16. Rhur: 17. Köln: 18. Aachen: 19. Koblenz: 20. Frankfurt.

dominates. Protestant Silesians and East Prussians, for instance, have gathered in the Protestant parts of North Germany, while Roman Catholic Silesians, Sudeten and Danubian Germans have settled more in the Roman Catholic areas of the south and west. This pattern has in some measure been the fortunate coincidence of flight, though it is known that in Westfalen Protestant refugees living in the strongly Roman Catholic Münsterland have left good accommodation to live under worse material conditions in the overcrowded Protestant parishes around Bielefeld. The most unhappy results of the migration have been where a vigorous group of refugees has moved into a parish of a different confession to its own and have upset a delicately balanced set of local forces. Even within the confessions, relations between refugees and non-refugees have not been without friction because of different usages and customs. It is much to the credit of the German churches that they acted irrespective of creed to alleviate distress.

One of the most successful ways of absorbing refugees has been through intermarriage with local people and by the mixing of local and refugee children. The total number of mixed refugee marriages is not known, though in 1951, of 153,000 marriages made by refugees, 109,000 were to non-refugee partners. A survey in Nordrhein-Westfalen revealed a higher marriage-rate among refugees than among local people. Marriages between a refugee man and a local girl were far more frequent than the reverse combination, despite a larger number of single women among the refugee population. Refugees have been keen to find a local girl as wife since it has frequently meant an entry into a family business, where a hard-won inheritance has been willingly handed to an East German son-in-law to replace a fallen son. Potential fathers-in-law have favoured a refugee with a reputation for hard work. Refugee girls, without close local ties and without the dowry still expected in Germany, have been little sought as wives. It has intensified the problem of the single woman seeking a means of maintaining herself, since large numbers who would normally have married are forced to find a permanent job in a labour market overcrowded and with pitifully few vacancies for women. The declassed position of refugees has made little difference in selection of a partner and in nearly all cases the determining factor has been social status *before* flight. The proportion of marriages between Reichsdeutsche refugees and local people has been proportionally greater than between Volksdeutsche and local people. Children of any union take the status of the father, except illegitimate children who take their mother's status. At the 1950 census, about 8 per cent of the 'refugees' in Western Germany were children born on or after the flight of their parents from the homeland. At school these children merge quickly with local children. Fewer successful attempts are made to keep alive in the children the memory of the unforgettable *Heimat* they have never known or cannot remember. It is now not uncommon for children of even fifteen or sixteen to be unable to understand the dialect of their parents: children of Upper Silesian parents can seldom speak or understand their parents' *Wasserpolnisch*. Young refugees are

establishing themselves increasingly firmly in West German life ; and it is questionable whether persons born on or after flight or even those who were under, say, twenty-one at time of flight, would return to the ' homelands ' if the opportunity presented itself.

The most important factor in raising living standards and accelerating the return to normal life in Western Germany has been availability of housing. Even before 1939 housing conditions in Germany were not as good as in the United Kingdom, while during the war over 20 per cent of German housing was completely destroyed and a further 20 per cent damaged beyond use without major repairs. In some of the larger cities over 60 per cent of the 1939 housing capacity was destroyed. In the United Kingdom during the war years we lost about 2 per cent of our 1939 capacity. The situation was critical without the immigration of so many refugees. Refugees, as late comers, had to take whatever was available : barns, cellars, attics, old military camps and disused air raid shelters. No serious attempt at rehousing could be made until after the currency reform of 1948, when building in villages began to go ahead far more rapidly than in towns. The majority of the 450,000 dwellings completed between 1945 and 1948 had been in the countryside, but after the currency reform the pace speeded up : in 1949, 215,000 dwellings were completed and by 1954, over 500,000 dwellings were being built each year. By 1954, the bulk of new construction was in the towns. The position of the refugees was, however, not good : by 1953, only 30 per cent were tenants of their own flats or houses compared to 77 per cent among non-refugee population ; while another 58 per cent were subtenants, although the corresponding figure among non-refugees was only 20 per cent. Thousands of refugees lived in all kinds of improvised and sub-standard accommodation. Over half the refugee population in Niedersachsen and Schleswig-Holstein lived in sub-standard accommodation, and in Nordrhein-Westfalen it was claimed 40 per cent of the refugees were unsuitably housed. Towards the end of 1955 there were still 30,000 refugees in Germany living in some 450 refugee camps and awaiting transfer to permanent accommodation. Up to the end of 1954, it was claimed that about 4 million refugees had been found satisfactory permanent accommodation on a post-war basis of four persons per dwelling. Despite Germany's record for rapid housing construction, it was insufficient to provide the 1·2 million publicly financed dwellings for refugees in under ten years unless a further speed-up in the rate of building could be made. Shared accommodation, with friction over the use of kitchens and bathrooms, makes the refugees feel most their de-classed position, particularly where they are forced to live in districts socially much below what they were used to before flight. As in other fields, housing is a problem where the refugee feels dependent upon the benevolence of the more powerfully placed non-refugee.

The pace of incorporation of refugees into the economic life of Western Germany has been governed by the development of the post-war German economy. The drastic lowering of the economic welfare after flight, shown in Table 1, has been closely linked with their lowered social status and has presented the German economy with a pool of

ability and resource for which it has been able to find no suitable place. An official survey has shown that only 35 per cent of the refugees are reasonably permanently resettled, 45 per cent are only in the early stages of permanent resettlement, while about 20 per cent cannot be considered for rehabilitation until they can be moved from the congested districts in which they are living. A primary problem has been the divergence between the occupational structure of the refugee groups and that of non-refugee population in the Federal Republic,

	BEFORE FLIGHT	AFTER FLIGHT
CHANGE IN INCOME		
Up to 200 marks per month	50	93
200-500 Marks per month	39	11
Over 500 Marks per month	12	1
CHANGE IN OCCUPATIONAL STANDING		
Labourers	45	87
Employees	20	7
Civil Servants	7	3
Self-employed	26	3

TABLE 1.—PERCENTAGE CHANGES IN SOCIAL STATUS OF REFUGEES BEFORE AND AFTER FLIGHT.[5]

clearly shown in Table 2. Groups with a large percentage of people engaged in agriculture and forestry have been especially hard to integrate, particularly where there is a considerable proportion of formerly independent farmers as among the Brandenburg and East Prussian groups. After the independent farmers, for whom neither

OCCUPATION	FEDERAL REPUBLIC	SILESIA	EAST PRUSSIA	BRANDENBURG
Farming and Forestry	26·2	29·7	49·6	33·0
Industry and Handicrafts	40·5	42·4	25·4	39·6
Trade-Transport	16·6	17·1	14·6	16·9
Public Service	12·8	8·3	8·4	8·5
Domestic Service	3·9	2·5	2·0	2·0

TABLE 2.—PERCENTAGE OCCUPATIONAL STRUCTURE IN FEDERAL GERMANY AND IN ANNEXED TERRITORY EAST OF THE ODER-NEISSE LINE, 1939.[6]

farms nor capital are available in Western Germany, the formerly independent businessmen are hardest hit by their new life, again because of the difficulty of recruiting new capital. Many professions have been crowded by wartime trainees, with poorer prospects and fewer openings than in 1939. This has been most marked in the medical profession, where refugee doctors have met opposition from non-refugees already established and who fear the newcomers will undercut their practices and subsequently reduce earnings. Despite equality in law, refugee applicants for a position have to fight favouritism for local men and overcome a strong parochialism in many parts of the

country. Some German employers will not accept qualifications and diplomas granted by non-German bodies or by the former Austro-Hungarian authorities. Some refugees, as a defence against the past and in a psychological attempt to *feel* equal, have been too pushing and energetic in their efforts to rebuild their shattered lives. They have scared non-refugees by their diligence and drive, creating a false belief that they are out to undercut and usurp local people. Although such a feeling has acted as an incentive and stimulus to local people to make greater efforts themselves, it has led to an unpleasant and unnecessary mistrust of the refugees in some places. It has been perhaps a factor in fostering the restless, impatient and highly-strung atmosphere of life in Germany today.

The refugee movement has left the German labour market with five million more hands than in 1939 but with no corresponding increase in the number of openings. Many firms, particularly in heavy industry and chemicals, have found it hard until recently to absorb even their own local workers, while the nature of the economy in the principal refugee districts has offered little hope of a lasting job. Unemployment among refugees has been twice as high as among non-refugees, and the former have formed well over a quarter of all the unemployed in Germany. The highest unemployment in Germany has been among the refugee communities in Schleswig-Holstein, Niedersachsen and Bavaria, where it was very acute immediately after the currency reform in 1948 had eliminated most of the jobs then available. Particular attention has been given to the overcrowded Länder, and of the 230,000 refugees found work in 1953-54, 64 per cent were in the ' refugee states '. By the end of 1955, the Federal Republic announced that it had found work for 90 per cent of the refugees, though not always in keeping with the refugees' ability or former status. It was considered that those remaining without work must be regarded as unemployable.

Openings for refugees have varied considerably between industries and have been poorest in agriculture. Until the currency reform of 1948, when food had been at a premium, most refugees had considered themselves fortunate to be able to work on farms for their keep ; but once a proper monetary system had been created, the refugee began to seek permanent and economically rewarding work. The best chances were found in coal-mining and in the consumer goods industries. Coal-mining offered attractive incentives of food and housing : in Nordrhein-Westfalen, 66 per cent of the former miners had found mining employment again by 1947. By 1949, some 23,217 refugees were working in mines in Nordrhein-Westfalen, though only 13,272 were miners by trade before flight. In the textile industry, which has been greatly expanded in Western Germany to offset the loss of the industry in Central Germany, nearly a third of the labour force is refugee. The skilled engineer from the Soviet Zone has found a very wide field in the engineering industry in Western Germany, which has also absorbed many young refugees as trainees. Opportunities of employment for former workers in heavy iron and steel, ship-building or chemicals in their old trades are only now becoming widespread

with the very recent expansion in these branches after the lifting of Allied restrictions on output.

The unbalanced economy left in Western Germany by the division of the country has offered the refugee scope to use his talents in correcting the unbalance. Refugee firms accounted for 10 per cent of all firms in Western Germany by late 1954, representing 5 per cent of the labour force and 4 per cent of the turnover.[7] They had by no means attained their size and wealth before flight. In a survey in Nordrhein-Westfalen, 420 firms employed an average of 14 per cent of their 1939 labour force : in heavy industry the figure was down to 3 per cent but in light consumer goods was over 64 per cent. Firms formerly located in the Soviet Zone, which used business contacts in the West in reconstruction, were the largest units. Over half the firms are in communities with under 10,000 people, accounting for 40 per cent of the labour force, while the next largest group was in the cities with over 100,000 people. Industries which had succeeded best were those little represented before 1939 in Western Germany and where the capital outlay to restart had been small. Capital and suitable equipment had been the most difficult factors to find before reopening. The refugee firms employed quite large amounts of non-refugee labour, though certain branches such as glass-making were almost entirely run by refugee labour. For this development, the Federal Government has found over £81 million up to the middle of 1955 and has issued the money in loans which have enabled over 200,000 refugees to become independent in business and the professions.

The most interesting refugee industry has been the glass and artificial jewellery manufacture established by refugees from Gablonz, Haida-Steinschönau and elsewhere in the Sudetenland. This traditional industry has been dependent for its re-establishment in Western Germany on suitable raw materials. The once comparatively concentrated industry is now scattered in the Euskirchen district in Nordrhein-Westfalen, where there are deposits of suitable Miocene sands in the nearby Ville and around Stolberg, and in Bavaria, where it treats raw glass from the Bavarian glass industry near Vohenstrauss and Warmsteinbach. Part of the Gablonz industry is associated with the ' refugee town ' built up in a disused munitions works in the forest at Waldkraiburg, Bavaria. This town had already over 2,000 inhabitants and 67 industrial undertakings employing more than fifty workers each, plus many smaller units, by late 1950. The labour force in the Sudeten refugee glass and artificial jewellery industry is over 95 per cent refugee. The industry, new to Western Germany, has had to fight bitter competition from its former plant in the Sudetenland now run under heavy subsidy by non-German labour.

The largest branch of refugee industry is in textiles and making-up. The principal groups are from Berlin and Silesia, though the origins are very diverse, with a considerable number of firms from Łódź in Poland. The large Sudeten industry is dominated by the Kunert stocking factory, formerly at Warnsdorf and now in the Allgäu. In Bavaria, textiles have flourished as a domestic industry (notably former lace and handkerchief makers) and more than a fifth of the

workers are employed at home. Textiles, represented by firms from Łódź, have been encouraged by the Government to develop in depressed former naval ports such as Wilhelmshaven. The great demand for housing and the little capital needed to open a building firm have made such firms popular with refugees. The newcomers have developed an extensive food and drink industry, specialising in East German liqueurs and foods not usually available in Western Germany. This branch has spread all over the country but is marked particularly in Niedersachsen and Schleswig-Holstein, while the refugee chocolate and confectionery firms have attached themselves to the local industry around Köln. The most important addition to Western German industry has been the highly specialised precision instruments and optical goods industry originally centred in what is now the Soviet Zone. The American authorities while in occupation of the Zeiss works at Jena in 1945 removed much irreplaceable machinery to a branch established at Aalen near Stuttgart before handing over to the Russians. This works now supplies the West with Zeiss optical equipment. The large Olympia typewriter works at Wilhelmshaven is a new development of the parent works at Erfurt, Soviet Zone. Electrical firms from Berlin and Saxony have been welcomed in Nordrhein-Westfalen along with other industries as a diversification of the over-specialised economy of the Ruhr. The new firms have a long way to go before reaching their pre-war prosperity: one well-known firm with 19,000 workers in 1939 was found in the West with 270 workers in a capacity for 400. This development constitutes an enriching and strengthening of Western Germany's economic position. The new firms, fighting such adverse conditions, have been among the most efficient businesses in the country.

Although post-war Western Germany has been forced to import twice as much of her food requirements as in 1939, the expansion of production has not been easy, despite a large reservoir of skilled refugee farmers. It has not proved too difficult to find lasting employment for refugee farm servants, but there has been too little capital and too few farms available to make good the losses of the formerly independent refugee farmer. The land reform in the Soviet Zone which created 64,000 small farms from 2·7 million confiscated hectares has not been possible in Western Germany. In the Soviet Zone, over 45 per cent of all agricultural land was in large farms of over 100 hectares, while the comparable figure for Western Germany is under 30 per cent. The many small farms in Western Germany could not be further divided and experience of the land reform in the Soviet Zone has been far from encouraging. The possibilities in Western Germany are the handing over to refugees of *auslaufende Höfe* (farms with no heir), the increasing of yield and the reclamation of waste ground. An example of the latter has been set by the settlement of refugee families in clearings in the Reichswald, but much ground is still untouched. The E.C.A. Commission on Refugees estimated that 500,000 hectares could be reclaimed in North Germany at a cost of DM 4,000 (£350) per ha. for moorland and DM 2,000 (£175) per ha. for heathlands. Costs of reclamation of coastal areas (*Watten*) would be as high as

DM 7,000 (£630) per ha. In South Germany, areas included would cost about DM 5,000 per ha. Most of cost would be labour. In North Germany the land would be in the Ems basin—a long projected Emsland Scheme—and on the moorlands of Niedersachsen, where methods already tried and proved successful in Holland could be used. In Bavaria the land would be principally in the Isar basin. There is also much land in the Lüneburg Heath which could be reclaimed, besides many forest areas. The amount to be recalled from the sea along the North Sea Coast would be approximately 10,000 hectares. Between 30,000 and 100,000 hectares could be won for agriculture by clearing the former tanning-oak groves in the Rheinland-Pfalz and other waste vegetation. Present yield on at least another 500,000 hectares could be substantially increased by better drainage. Land reform by rearranging holdings is another possible field. By late 1954, some 49,000 of the 300,000 formerly independent farmers had been given new farms, either on long-term loans or leases.[8] Although the contribution to agricultural knowledge already made by these refugee farmers is recognised, it is felt that the number of successful tenants among refugee farmers may well be limited.

Government aid, where it has been available, has been directed as far as possible towards giving refugees an opportunity to re-establish themselves under equal conditions to local people. It is regarded as psychologically sounder than giving refugees a privileged position or offering them even the most generous charity. The uneven distribution of the refugees in 1946 made it clear that their integration could only be managed by large rehabilitation and development schemes in the overcrowded Länder Schleswig-Holstein, Niedersachsen and Bavaria or by extensive migration to Länder such as Nordrhein-Westfalen and the French Zone territories, with a small proportion of refugees in their population. Attempts during 1946 to distribute the refugee load more evenly failed because of lack of co-operation from the French and Soviet authorities with those of the British and American Zones, who from the start recognised the need for concerted action. In 1947, a measure of agreement was reached to allow reunification of divided families ; though a general will to go further was lacking. Any lasting achievement was hindered by the unsettled conditions in towns, the lack of housing, the general standstill in industry, and the Allied restrictions on movement. The German authorities pressed for the currency reform of 1948 to be made an opportune moment for an equalisation of burdens to provide means for refugee rehabilitation. The proposal was rejected by the Allied occupation authorities. Instead an Immediate Aid Law was passed to tide refugees over a hard period of readjustment. The creation of a Western German Federal Republic in 1949 resulted in the formation of a Ministry for Refugee Affairs to co-ordinate the work of the Länder, whose primary responsibility the refugees remain. The equality of refugees and non-refugees was given legal form in Article 116 of the German Basic Law.

A great deal of available money has had to be spent in relieving the distress of old people—though pensions are pitifully low—and in

assisting unemployables and camp inmates. Much emphasis has been put on moving refugees from overcrowded Länder to places where work and housing have been available. As the result of wartime damage, housing has seldom been available where there have been jobs. Despite all the obstacles, 723,000 refugees have been effectively resettled between 1949 and 1954, 79 per cent of the total awaiting resettlement. The cost for each refugee, including housing, has been almost £350. Large numbers have, with government encouragement, managed to resettle by their own efforts.[9] Between 1946 and 1955, these plans have resulted in a noticeable change in the distribution of the refugee population towards a more equal division, as Table 3 illustrates.

Land	Total Population (refugee and local) —as percentage of total in Western Germany—		Refugees (all categories) —as percentage of total in Western Germany—		Increase/Decrease in Refugees (all categories)
	1946	1955	1946	1955	1946=100
Schleswig-Holstein	5·8	4·6	14·0	7·1	91
Hamburg	3·2	3·5	1·3	2·7	325
Niedersachsen	14·5	13·3	25·5	19·2	120
Bremen	1·1	1·2	0·6	1·1	305
Nordrhein-Westfalen	26·3	29·2	12·4	24·7	316
Hessen	9·1	9·2	9·5	9·5	160
Bayern (Bavaria)	20·4	18·3	26·5	19·3	116
Rheinland-Pfalz	6·2	6·5	0·7	3·3	730
South-West State	13·4	14·2	9·5	13·1	218
Federal Republic	100·0	100·0	100·0	100·0	159

TABLE 3.—CHANGE IN DISTRIBUTION OF REFUGEE POPULATION, 1946-55.

Source : Figures issued by Statistische Bundesamt.

A constant obstacle to resettlement of refugees already in Western Germany has been the steady inflow of new immigrants from the Soviet Zone, most of whom need immediate monetary assistance.

Reference has already been made to loans for refugee businesses and for professional men. Money has also been available for refugee students, though it is often felt not to be in sufficient amount. There are many concessions for cheap railway fares for refugees (over 3 million are granted yearly) and loans for furniture and housing are issued by a number of organisations, both private and official. Government offices are by law required to employ at least one refugee in every five workers and special consideration in issuing government contracts is given to refugee industries and also to non-refugee businesses in ' emergency areas '.

Integration has been necessarily slow, because every attempt is made to ensure that any measures taken for any group or district do not injure or prejudice anything already achieved. It is necessary to safeguard the interests of local people or long-established refugees,

particularly in places where large numbers of in-coming refugees have to be settled and housed. The task has been hardest in the Ruhr cities, where there has been disturbing friction. The Federal Government has received little direct outside help and has been unable to apply all the recommendations made by the E.C.A. Commission, but it has nevertheless achieved a great deal and exceeded the hopes of even six years ago. It cannot be said that the refugee problem is solved, but it has gone a long way towards a solution from the internal aspects, though its international implications are still disturbing in an unsettled Central and Eastern Europe.

[1] *Deutschland-Jahrbuch*, 36 Kapitel : ' Flüchtlinge und Vertriebene ', Essen, 1953.

[2] Many writers on refugees in Germany remark on this aspect of the movement, which is also borne out in the official statistics of the Statistische Bundesamt, Wiesbaden.

[3] The figure includes some 15,000 Germans in Austria who were to be moved to the French Zone under the Potsdam Agreement and the Control Council Agreement on Refugees of November, 1946.

[4] In some of the most heavily damaged cities where rebuilding had been very slow up to 1950, the increase in the number of refugees was small. In these cities, the main increase came after 1952, when it was swollen by large numbers of people fleeing from the Soviet Zone.

[5] Schulze-Westen, P., *Das Flüchtlingsproblem*, Dortmunder Schriften zur Sozialforschung, 10, Dortmund, 1949, and figures issued by the Bundesminister für Vertriebene, Bonn, at various dates.

[6] Bundesminister für Vertriebene.

[7] Press and Information Office, German Federal Government, Bonn. The problems of the refugee industries are discussed in Dittrich, E. : *Die Wiedereingliederung der Flüchtlingsindustrien in die Westdeutsche Wirtschaft*, Bonn, *n.d.* and in *Der Aufbau der Flüchtlingsindustrien in der Bundesrepublik*, Kiel, 1951.

[8] E.C.A. Technical Assistance Commission on the Integration of the Refugees in the German Republic. Report issued in Washington, 1951. Later figures by Bundesminister für Vertriebene.

[9] Bundesminister für Vertriebene.

Obituary

The Society notes with deep regret the recent death of Professor Rudmose Brown which will be marked by an obituary notice in the next issue of the *Magazine*.

CLIMATIC FLUCTUATIONS AND FUEL REQUIREMENTS

GORDON MANLEY

Paper read to Section E, British Association for the Advancement of Science, Sheffield, 1956

FIFTY million of us choose to live on this island of Britain. We still rank quite highly with regard to the number of horse-power developed per head of the population, a measure of cultural progress which geographers might do well to consider ; for the achievement of man depends on the amount of spare energy at his disposal. You will recall that Sir Harold Hartley made this the subject of a memorable Presidential Address to the British Association in 1950. But our principal source of energy, indeed very nearly our only large-scale source of energy apart from food is coal ; and in recent years we have begun to realise that we no longer produce enough coal for our requirements. Consumption has now overtaken output from mines and opencast workings, and we now need to import as much coal, or its equivalent in fuel oil, as we formerly exported. Our production is about 220 million tons per annum and in 1955 our import, expressed in terms of coal, had risen to about 12 million tons. This costs about £90 million and what is more, must largely be obtained from dollar sources. Hence its marginal significance to our balance of trade is very great.

Of the coal we produce, the total inland consumption is about 210 million tons and of this something near one-third goes to provide our domestic, office and factory requirements of energy for lighting, cooking and heating. From year to year it is the heating requirement that forms the most variable element ; hence we need to pay attention to the chances of weather. It is the purpose of this paper to provide data and to show that the range of the variation in demand for fuel for heating is just about equal to the amount we now find it necessary to import, i.e. about 4 per cent. of our needs. We can now assert that the variations in the seasonal temperature directly affect the balance of trade. With regard to our energy requirements we now live on a remarkably precarious margin, dependent on seasonal fluctuations which cannot as yet be satisfactorily forecast.

Numerous papers have been published in recent years in which the relationships between electricity and gas consumption, or that of coal, and variations of winter temperatures have been studied. It is not my purpose here to discuss the many contributions already made ; suffice it to point out that a good deal of emphasis has been laid on the use of ' day-degrees ' both here and in America. The amount of energy required to maintain the internal temperature of a warmed building at some given level is very nearly proportional to the difference between that temperature and that which prevails in the outside air. It has become customary to take out the accumulated deficit in ' day-

degrees' below 65° F. in America and Canada and similar studies have made use of 60° F. for Britain (cf. for example Grierson 1945).

Precise determination of the relationship between heating requirements and the incidence of cold weather is not simple ; I have to thank experts from the National Coal Board for the opportunity of discussion. For example, at the intermediate seasons there is an obvious tendency to use electricity or gas for short spells, rather than light a fire or start the central heating. There are very many local factors to consider in individual cases ; for example, the effect of wind on an exposed detached house is much more serious than that on a house in a terrace. In many houses where a fire is kept for cooking purposes there may not be such a rapid increase in the demand for fuel in cold weather. Even local customs may affect the demand. Then there are economic factors ; household demand for fuel is appreciably curtailed during a local slump. Taken over the country as a whole, however, it is possible to reach broad conclusions with regard to the overall effects of weather and these are primarily related to the temperature of the cooler months. Here I must express my indebtedness to Dr G. H. Daniel of the Ministry of Fuel and Power for favouring me with a summary of his conclusions in this field. In particular, he has shown that the effect of abnormal departures from the average is not so great as that of the normal departures for which people are accustomed to provide. Because a normal January is ten degrees colder than a normal October, so much more fuel is used ; but if in a particular year January is twelve degrees colder than October, the increase in the demand for fuel is not quite commensurate with the additional fall of temperature. This seems to cast an interesting sidelight on our national habits ; serious abnormalities are usually of short duration and for the two or three days they last we merely let the house get a little colder and hope for the best.

For maintenance of comfort while at work, customary requirements vary considerably in respect to factories, offices, shops and houses. In order to compare the requirements in various districts, 'day-degrees below 60° F.' have been widely used. This cannot apply to all buildings ; and if such a high figure is adopted, statistics suggest that Bradford for example would scarcely be able to do without a fire in summer at all. Bearing in mind our general habits as a nation it has seemed to me that one might more fairly refer to a mean temperature of the order of 56°-57° F. as that above which lighting and cooking impose a fairly constant load and additional heating is unlikely to be demanded on any significant scale. Within a room there are minor sources of heat represented by the occupants, lamps, and the heat from adjacent rooms such as kitchens ; sometimes there is external sunshine as well. Hence as a datum, below which the demand for artificial heating is likely to rise in a linear relationship, I have adopted a mean temperature of 57° F. at sea-level, not for the sake of being different, but because this seems to accord with actualities. For example, Mr Rose (1950) has shown that the relationship between gas consumption and temperature flattens out to become nearly linear below about 53° F. Mr Spurr (1954) has drawn attention to the high correlation between

air temperature and electricity consumption. Our customs appear to be of long standing, for in Southern England, even in the eighteenth century, a fire was not usually lit in the sitting-room until late in September, and was dispensed with about the middle of May, the respective mean temperatures being about 56° and 55° F. But in Northern Scotland, with a July mean of 56° F. there are at best but a few days on which some form of artificial heating is not used, and not far from Sheffield the same can probably be said of places like Tideswell. Lastly, in America, although the temperature in occupied rooms is commonly 72° to 75° F., the heating requirements are worked out in relation to outdoor deficits below 65° F. Hence for England, where we normally keep our rooms in the lower sixties, a sea-level mean of 57° F. does not appear by comparison unduly low for purposes of calculation ; and for most of our populated areas it covers the period from mid-September to the beginning of June.

Granted this general criterion it becomes a relatively easy matter to present a picture of past vicissitudes. This has already been essayed in the Ministry of Fuel and Power, making use of the Meteorological Office annual averages of temperature. Annual averages referring to the British Isles as a whole are available back to 1866 and have been supplemented by using some of the older London data, in the form of annual averages, back to 1763 ; I think however that these may be subject to some criticism in the light of later findings. Moreover, while annual averages are interesting in themselves, they do not give an immediate impression of the range of the variation of temperature covering the ' heating season ', September to May, for which the build-up of coal stocks is important. The vast majority of our population lives in England and southern Scotland, hence the variations in the mean temperature for the smaller area, namely " England and Wales ", probably offer a sufficient guide in respect of fuel demand. Further, for that area we can make use of monthly rather than annual means. It is noteworthy that the mean of the departures from normal of the monthly means at Edinburgh and Greenwich stands very close to that observed for the English Midlands (Manley 1953).

But the tables from official sources of the monthly means for " England and Wales " only cover the years back to 1901 (Glasspoole and Hogg 1942). Hence in order to present a more comprehensive picture of the chances of variation in heating requirements over the longest possible period I have made use of the long-term series of monthly means which I have recently compiled (Manley 1953) for what I have called " Central England ", to avoid confusion with the existing Meteorological Office nomenclature. Individually, these values are broadly representative of the Staffordshire-Shropshire lowlands, and have been assembled from a variety of older records, for the most part scattered over the Midlands. The series, beginning in 1698, provides for this country the longest temperature table in the world ; but it will be understood that the imperfections of the earlier observational data are such that it would be unwise to make excessive assertions with regard to its accuracy before 1800. Nevertheless, there is support from other scattered observations, and the general accordance

with the eighteenth-century records on the Continent is remarkably satisfying.

	Central England	England & Wales	Difference	Standard Deviation
Jan.	39·1	40·2	+1·1	±0·4
Feb.	39·5	40·6	+1·1	±0·4
Mar.	42·3	43·2	+0·9	±0·2
Apr.	46·4	47·1	+0·7	±0·3
May	52·5	53·0	+0·5	±0·4
June	57·5	57·9	+0·4	±0·4
July	60·8	61·3	+0·5	±0·4
Aug.	60·1	61·0	+0·9	±0·3
Sept.	56·1	57·2	+1·1	±0·2
Oct.	49·8	51·1	+1·3	±0·3
Nov.	43·1	44·5	+1·4	±0·4
Dec.	40·1	41·5	+1·4	±0·4
Year	48·9	49·8	+0·9	±0·1
Sept.-May	45·4	46·5	+1·1	±0·1

TABLE 1.—THE RELATIONSHIP BETWEEN "CENTRAL ENGLAND" AND "ENGLAND AND WALES"

Based on the individual Monthly Means (°F.) for 1901-1950—(*Q.J.R.Met.S.*, 1942 and 1953). The "Central England" means are based on (Oxford+Lancashire)÷2. "Central England" values are broadly similar to those at Birmingham (Edgbaston) or Shrewsbury.

To illustrate the relationship between these "Central England" monthly means, and the monthly means already published for "England and Wales", Table I will suffice; the overall difference averages 0·9° F. It will be evident from the size of the standard deviations that not only are the differences consistent; in general a value for "England and Wales" at sea level can be derived from the values in the "Central England" table within close limits. Hence when we derive for "England and Wales" the mean temperature for the nine months September-May the standard deviation of the result comes down to little more than 0·1° F. 'Accumulated deficits' over the cooler months can therefore be calculated from the "Central England" table without serious error, so far as that table itself may be relied on.

We may therefore inspect the statistics of monthly means given in that table, dividing it into three nearly equal portions of 75-80 years. For each of the three periods 1721-1800, 1801-80 and 1881-1955 the means and the standard deviations for each month are given below (Table 2). It will be seen that they compare remarkably well. Moreover, the number of values falling within the limits expressed by the

standard deviation agrees quite well with theory; and eighty years should be a sufficient length of time for the effects of such trends as may exist to be largely eliminated.

Period	J	F	M	A	M	J	J	A	S	O	N	D
1721-1800	37·2	38·8	41·1	46·3	52·4	58·1	60·9	60·4	56·5	48·9	42·4	38·9
1801-1880	37·4	39·3	41·6	46·4	52·2	57·8	60·4	59·8	55·6	49·4	42·3	39·2
1881-1955	38·7	39·2	41·8	46·3	52·2	57·6	60·7	60·0	55·9	49·3	43·4	39·9

A. Comparison of the Statistics over Three Lengthy Periods of Time

1721-1800	3·6	3·1	2·8	2·4	2·2	1·9	1·9	1·7	1·9	2·1	2·4	2·8
1801-1880	3·5	3·3	2·4	2·1	2·3	2·1	2·2	1·9	1·9	2·2	2·6	3·6
1881-1955	3·2	3·4	2·6	2·1	2·0	1·7	2·1	2·1	1·9	2·3	2·5	3·0

B. Standard Deviations for Individual Months from the above Means (A)

TABLE 2.—MONTHLY MEAN TEMPERATURES FOR "CENTRAL ENGLAND"

1721-1800 PERIOD OF SCATTERED RECORDS OF VARIABLE QUALITY, IMPERFECT INSTRUMENTS, EXPOSURES AND HOURS OF READING.

1801-1880 PERIOD WITH RELIABLE RECORDS CAREFULLY REDUCED AND STANDARDISED BY INTERCOMPARISON.

1881-1955 PERIOD OF STANDARDISED EXPOSURES WITH OBSERVATIONS ACCEPTED BY THE METEOROLOGICAL OFFICE.

The general accordance of the standard deviation for each month in each period is reassuring. The periods appear to be long enough to diminish the possible effects of trends.

At this stage I think it appropriate to refer to the work of our President, Professor Austin Miller, who has shown (Miller 1951) that accumulated excesses and deficits of temperature above or below a given figure, based on 'day-degrees', can be represented almost equally well by 'month-degrees'. This I have been able to check by using some of the data from Reading (Parry 1954). In the present state of our tabulated information it is quite impracticable to extract 'day-degrees' over long periods; neither are we, as I have said, yet provided with official data, even for monthly means, with regard to the greater part of the nineteenth century. Yet we must take account of the range of past vicissitudes; what has happened before may happen again; hence I hope I have sufficiently demonstrated my case for presenting the diagram which now follows (Fig. 1).

This diagram provides a summary of the incidence of variations in what we may call the 'interior-heating load' during the past two and a half centuries. These are calculated by totalling the deficits over the months September to May with reference to a basic monthly mean temperature of 56° F.; and this corresponds very closely to an average of 57° F. for England and Wales at sea-level.

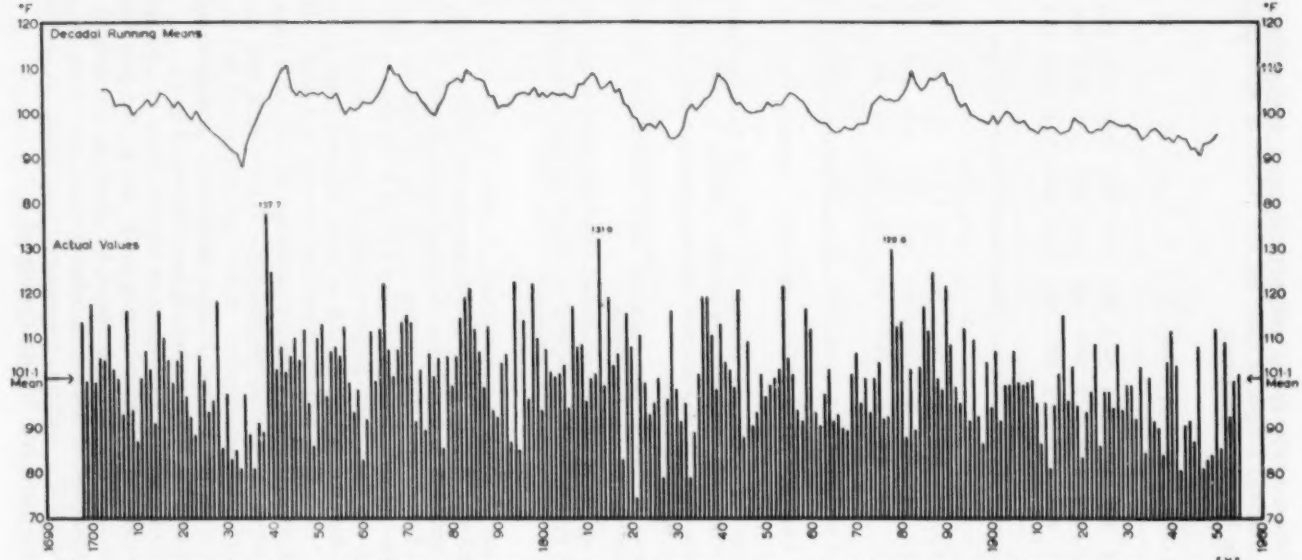

Fig. 1. The seasonal variation of the " interior heating requirement " since 1700 : accumulated deficits in month degrees below 56° F. Based on " Central England ".

A departure of 30 month degrees corresponds with a change in total coal consumption of 5·7 million tons under present-day conditions. The peaks in 1916-17, 1940-41 and 1950-51 are much below those of the Victorian era. Mean deficit 1921-50=94° F.

The first point for comment is that the picture presented is one of wide and erratic variations. With a mean taken throughout of 101, the range is from 74 in 1821-22 to 137 in 1739-40 and 130 in 1878-79. No obvious pattern can be said to present itself, even when we smooth the values into decadal running means. The extreme range of the fluctuations appears tolerably constant ; this is a matter we might already have surmised from what we know of our natural and cultivated vegetation during the past few centuries.

The possibilities represented by some of the past years, such as

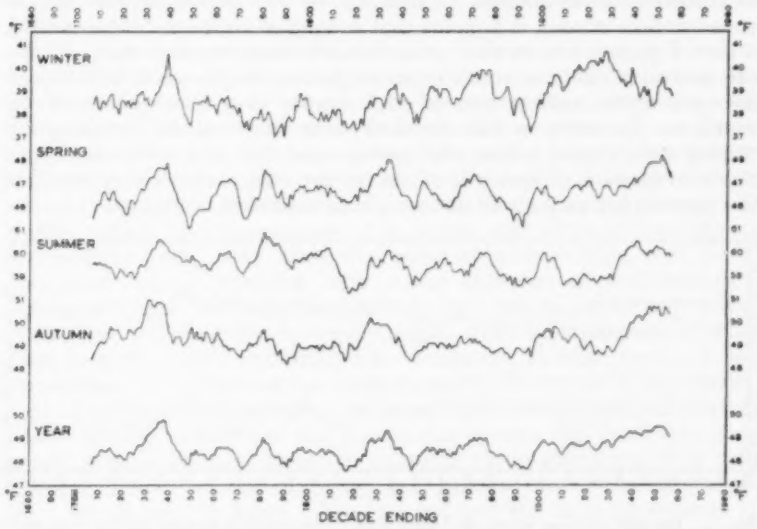

Fig. 2. Decadal running averages of seasonal and annual mean temperatures : Central England 1698-1955.

1878-79, are manifest ; indeed the extreme values for several 'cool seasons' before 1900 lie far above any during this century, in which 1916-17 ranks as the most demanding with regard to additional warmth; the total deficit in that season being 20 per cent greater than the average (94) characteristic of the past three decades. It is important to recognise that the period 1878-91 gave several seasons with a deficit 30 per cent above the present average value ; this was largely a consequence of colder weather in spring. The totals are not merely representative of the effects of the notoriously severe winters such as 1895 or 1947. This is very noteworthy ; the long cool season of 1950-51 set up a greater demand for warmth than 1946-47, on account of the fact that the autumn of 1946 was mild and the later spring of 1947 was decidedly warm (Fig. 2). For many years past, since about 1925, the majority of the autumns and springs have been warmer than was characteristic of some earlier decades, and up to 1950 have continued to offset the results of cold winters. Some would incline to the view that since 1950 this much discussed amelioration can no longer be said

to prevail. Of the past 68 months, 38 have fallen below the average characteristic of 1921-50, and only 24 have lain above it. The summer of 1954 was the coolest since 1922, and the warm summer months of 1955 only served to offset a very cold February and March ; moreover 1956 also counts as ' cool '. But it can be agreed that the erratic incidence of events renders it very difficult to claim that a trend can be said to have set in. Further, in any ten successive seasons at least one will rank as a marked exception to the general rule.

From such comparisons as I have been able to make with the results of statistical investigations carried out by Dr Daniel on the rate of consumption of coal, it appears that so long as we burn coal as we do, a rise of 30 per cent in the ' accumulated temperature deficit ' in any one season is likely to result in an additional requirement of between five and seven million tons of coal, simply as a consequence of the weather. In other words the difference between the consumption during a very mild winter and spring, and that of a severe season, is likely to amount to upwards of ten million tons ; this is very much of the same order as the amount we are now having to import.

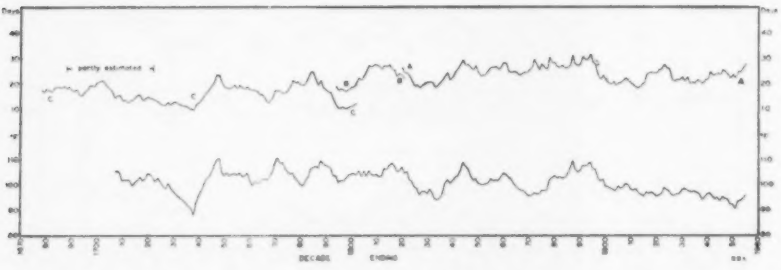

Fig. 3. Decadal running means of " snow days " (the seasonal number of days with snow in the London area) and fluctuations in the seasonal heating requirement (based on accumulated deficits in month degrees).
A : " First order " observations. B : " Good standard " observations. C : " Fair standard " observations.

I have provided one further diagram (Fig. 3) in support of the table of data which I have put up. If, taken as a whole, the months September to May are cool one would expect the frequency of snowfall to increase. The accordance however will not be very close as snowfall is very largely confined to the six months November to April, whereas we are dealing with nine months. In the London area we have observations of the frequency of snowfall back to 1669 with only short interruptions ; and diagrams such as this will in time provide a means of estimating the chances of blocked roads in the uplands—a further instance of the application of climatology in the service of man. The quality of the observations is however not uniform ; much depends, for example, on the extent to which an alert watch can be kept through the night, as at Greenwich. The diagram therefore shows the fluctuations in the seasonal total of days with snow in the London basin by " A " standards since about 1815, and by " B " and " C " (" good and fair daytime observation ") before that time compared with the

fluctuations of the mean temperature of November to April inclusive. These standards of observation are those given in a recent paper (Ashmore 1952). In Figure 3 the difference B to C can be shown to average about eight, which supports the view that since the later seventeenth century the range of behaviour of our weather cannot have lain seriously outside the experience of the last fifty years. The mild seasons between 1726-39 are noteworthy and are supported by the Dutch records. We may note the suddenness with which the very severe season of 1739-40 then set in. That of 1878-79 appears likewise to have set in with little that can be claimed in the way of unusual events beforehand.

The close relationship now developing between our marginal import of fuel and the prevailing temperature of the cooler months begs the question whether anyone is yet justified in attempting to make seasonal forecasts. This is now a major problem and we cannot hope for its rapid solution ; but the unusual assemblage of upper air observations during the forthcoming International Geophysical Year should provide valuable material. Meteorological theorists have suggested that periods during which the appearance of sunspots and their accompanying phenonema leads us to think that solar activity is high, tend to be associated in our latitudes with wider extremes of meteorological behaviour ; the oncoming maximum in 1957 should prove interesting. Such views will be difficult to substantiate until we know exactly what does happen to the incoming solar radiation at high levels in the atmosphere, and what are the consequences with regard to the persistence or otherwise of particular patterns of the atmospheric circulation at the surface. Moreover the factors that govern the development of severe winters do not appear to resemble those associated with cold springs. The association of the two may in some measure be coincidental ; we do not yet know. We can but put the facts on record. I think it will be agreed that, faced with Figure 3, he would be a rash man who would declare that we shall not experience that most taxing combination of a really severe winter and a cold spring to follow, in the near future. That it is necessary to remember the possibilities of spring rather than winter is very evident. Already the difference in the household fuel allowance between Northern and Southern England justly takes account of the effects of the cooler Northern spring.

Tables illustrative of the vicissitudes over a long period may occasionally have some value for those who must endeavour to forecast our fuel requirements towards the end of winter, when stocks are running low. Our climate being what it is—considerably under the influence of the surrounding seas which exercise a conservative effect—it might well be thought that towards the end of a cold winter such effects would tend to become manifest about February-March. That is, an unusually cold February would tend to be followed by a March below normal. Relationships of this kind do appear to exist. Of twenty-eight Februaries with a mean of 35° F. or lower, that is exceeding four degrees below the long-term normal, twenty-three have been followed by a March below normal and of these, seventeen of the Marches might be called severe. This was memorably true of 1917,

1947 and 1955, but did not hold for 1956. Such relationships may provoke further enquiry, as with regard to the characteristics of the warm Marches following cold Februaries which form such a decided minority. At the same time, no very well-defined tendencies appear to exist between cold Januaries and cold Februaries, or between March and April ; and the proverbial countryman's view that an early winter, setting in December, will be a hard winter is insufficiently confirmed. To make use of monthly mean temperatures is but a crude and elementary approach to one of the major problems likely to affect our welfare ; and there is not much comfort in the statement that we very rarely experience more than nine months in succession below normal. But in time, with the aid of five-day means, a world-wide index of pressure patterns, and an electronic computer, we may be in a better position to work out chances as each winter develops.

The need for research in this field is adequately shown by the fact that we have now become importers of energy, not merely in the form of food but also as fuel. Geographers may essay a new task ; that of assessing and comparing the ' energy balance ' of this and other countries. The fluctuations in demand imposed by our comfortable climate are still much below those in many other parts of the world ; our seas are open, distances and assemblage costs are relatively small. But we dissipate much energy in friction and these permanent assets in respect of our energy expenditure are now offset by the need to import. Climatic fluctuations may be small, but in our over-populated island failure to allow for them may now jeopardise our success in other fields. Hence they are deserving of the utmost study.

I have to thank Miss Elizabeth M. Shaw B.Sc., for assistance in compiling and drawing the diagrams.

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A MIRROR TO ALL THE ITALIES: A REVIEW

C. J. Robertson

This long awaited-work[1] by the Professor of Economic Geography in the University of Rome has the purpose of interpreting the economic geography of each of the historic regions of Italy against its physical and biological infra-structure and in relation to the conditions in the other regions and in the country as a whole. When the unification of Italy was being carried out, about a century ago, it had been hoped in some political quarters that the old regional consciousness might be submerged in the wave of national enthusiasm. The regions bore, and indeed still bear, the marks of their very diverse political history. While continuing, as *compartimenti*, to be officially recognised as convenient statistical units, they had no juridical status. In the last pre-war reorganisation of administrative units this status was limited to the much smaller *provincia* and to the *comune*. But the province remained merely an administrative convenience with little or no existence in the popular consciousness; it occupies a middle plane between the great historic regions such as Lombardy and Tuscany, and, on the lower plane, smaller regions, such as the Val d'Aosta, the Garfagnana, the Marca trevigiana, the Ciociaria and the Sila, with varying degrees of historical-geographical personality. To great contrasts in relief and climate are added the vicissitudes of a long history, so that each region has its particular economic and social physiognomy, apparent both in agricultural landscape and in urban morphology. In some the landscape shows the traces of a multi-millennial transformation. Amongst a people so profoundly attached to a homeland so rich in variety, physical and cultural, it is not surprising that, in the century since unification, political blood transfusion between the great regions has not always been easy.

How far the major regions integrate the smaller ones and how successfully they themselves are integrated and harmonised in the national economy are problems of acute interest today. The constitution of the Italian Republic gives juridical recognition to the historic regions and regional autonomy has entered into practical politics. It is in part to this development that the present work owes the support accorded to it in 1948 by the Italian Association of Chambers of Commerce. It is appropriate that Professor Milone, with his long and varied experience in the sphere of economic geography, industrial and agricultural, regional and systematic, should have undertaken the work. For few books in the geographical field by a single author is the epithet monumental so appropriate as for this volume of 1,296 pages, weighing four and three-quarter pounds; for still fewer is the epithet as appropriate to its quality as to its bulk. In 'Milone' we have what seems likely to become the standard work of reference on the economic geography of Italy. There is here a generous fund of material from the author's many years of labour in the preparation of the volume and many subsequent writers on the geography of Italy will doubtless draw on these rich resources. There is more indeed in the regional summaries at the head of each chapter than can be gathered from some textbooks.

The text, too, is supplemented by no less than 128 pages of bibliography, containing something like 5,000 references. But this is no mere accumulation of detail. It is a work of economic geography not only in which due account is taken of the physical and biological distributions but which is notable for its insight into historical geography. The flowing descriptive style is enlivened, too, on occasion by personal reminiscence that comes from long familiarity with the subject-matter.

While the aim of facilitating comparison of the various regional economies imposes a certain measure of uniformity in treatment, the differing regional emphasis of structure and function is reflected both in the weight given to particular topics and in the background data for Italy as a whole that are incorporated in the different chapters. The general matter for the Italian economy as a whole can only be built up by consulting many chapters but the reader is somewhat facilitated in this by an elaborate system of indexing by topic and by region. Perhaps a general introductory chapter would have better served this purpose. Some topics, too, are not completely dealt with under one head: food supply may appear under both vegetation and agriculture.

In general, the individuality of the region is first sketched in. Then comes the natural and cultural vegetation, with some account of individual crops. There follows agriculture as a whole, with soils, proportions of crops, livestock, value of production, land tenure and character of food supplies. The development of mining and manufacturing industry, energy supplies and transportation facilities and, where appropriate, tourism, emigration and port development come next. Trade and various economic indices are discussed. Regional financial statistics based on the general tax on income and on land tax are summarised though Professor Milone is very conscious of the difficulties in their interpretation. Not only is there a rich statistical documentation incorporated in the text but a large number of cartograms is included among the many maps. A number of the maps illustrate historical development: for example, the successive stages of the port of Genova, the decay of Ravenna, the area between the Po di Goro and the Po di Volano before and after reclamation.

From time to time we rise above the massive documentation as we mount with the author to some eminence, perhaps, as in Umbria, to scan with him almost the whole region in a *sguardo generale*, or in Sardinia, where we are taken to the summit of Bruncu Spina in the Gennargentu, to view the island. We must be grateful to Professor Milone for encouraging this refreshing habit. Sometimes we are enchanted by the physical beauty of the scene, as in Campania, with its volcanic forms rising from the softer curves of the sedimentaries. At times we are gripped by a vivid description of the, in places, Dantesque features of the Italian landscape, as in the Mesozoic interior of the Marche, where we view the hills with "*fianchi erti, scoscesi, franosi, che raccolgono nei valloncelli o sulle falde, enorme pile di sassi, in una trista petraia che perpetuamente si rinnova*" (with steep and rugged sides, broken by landslides and collecting in their gullies and on their slopes enormous piles of rocks in a sad wilderness of stone, perpetually renewed). But nearer the coast, in the same region, a touch of humour lights up

the cultural landscape in which we see the "*orticelli domestici, che crescono da un anno all'altro, come i figliuoli e i prezzi*" (domestic gardens that grow from one year to another, like children and prices).

The contrasts in development of the three great northern regions—Piedmont, Lombardy and the Tre Venezie (Tridentine, Venetian and Julian)—are well brought out. The historical rather than physical unity of Piedmont, despite its name, dating incidentally from as late as the thirteenth century, is emphasised. Lombardy, transitional in character, owed its regional differentiation to the trade and energy resources that favoured the growth of industry and to the development of irrigation. The Tre Venezie, on the other hand, late in industrial development, were at a disadvantage against the more highly organised industry of Lombardy and Liguria ; their industry suffered from both Napoleonic and Austrian discouragement, late development of railways and sources of energy and a peripheral location in the unified Italy. There is a penetrating discussion of Emilia, which was settled at a very early date and which is the richest of the mainly agricultural regions but, with its great surplus of casual labour (the *bracciantato*), is traditionally a focus of social discontent. On the other hand it has benefited by some of the largest schemes of land reclamation and is now the scene of new developments in gas and oil. Tuscany is treated as transitional between the Po plain and the Southern Apennines and as representing an Italian 'average'. The partiality of so many British lovers of Italy for this region, a partiality puzzling to some Italians, is thus seen to have been an unconscious recognition of possibly the most representative of all the regional expressions of Italian landscape and culture. Professor Milone emphasises the long history of human transformation of its landscape, especially the slow reclamation of its valleys. Passing southwards to Lazio one finds that Rome is treated more summarily than might have been expected. Despite the mediocre development of industry in this region, the peculiarities due to the city's role as capital might be thought to deserve rather more analysis. Campania, with a population density of 3,000 per square kilometre along the shores of the Gulf, stood close to Lombardy and Piedmont a hundred years ago, when it was the industrial focus of the Kingdom of the Two Sicilies but unification brought a severe shock to the South and Naples declined. Further south still, in Calabria, Professor Milone significantly substitutes for his usual section on indices of wealth a section entitled "indices of poverty". Himself a Southerner he ends his book with the fervent wish that, in the interests of all, the great chasm between the social and economic conditions of the regions of the North and those of the regions of the South may be filled.

The appearance of a comprehensive work on this scale and on this plane for a single country is a major event in geographical studies. In this volume Italian economic geography can worthily take its place alongside the other magistral contributions by Italian scholars to economic studies in this series.

[1] *L'Italia nell'economia delle sue regioni.* By FERDINANDO MILONE. 9½+6½. Pp. xiv +1296. 82 figures in black and white, 12 in colour. 3 folded maps in colour. 208 tables. Torino : Edizioni Scientifiche Einaudi. 1955. L. 12,000.

THE BORDERS

The following suite of photographs (Plates 1-4), together with their explanatory captions, illustrates the main aspects of that south-eastern region of Scotland—the Borders : the upland rim of moorland separating the lowlands of east-central Scotland from the north-east of England, the rich agricultural lowlands of the Merse and the hill-foot zone of contact between them, with the River Tweed as their link and focus.

It is hoped to present, from time to time, comparable sets of photographs of other regions or aspects of Scotland.

Pl. 1 : Leithen Water, Peeblesshire : view downstream from junction of Leithen and Glentress Waters

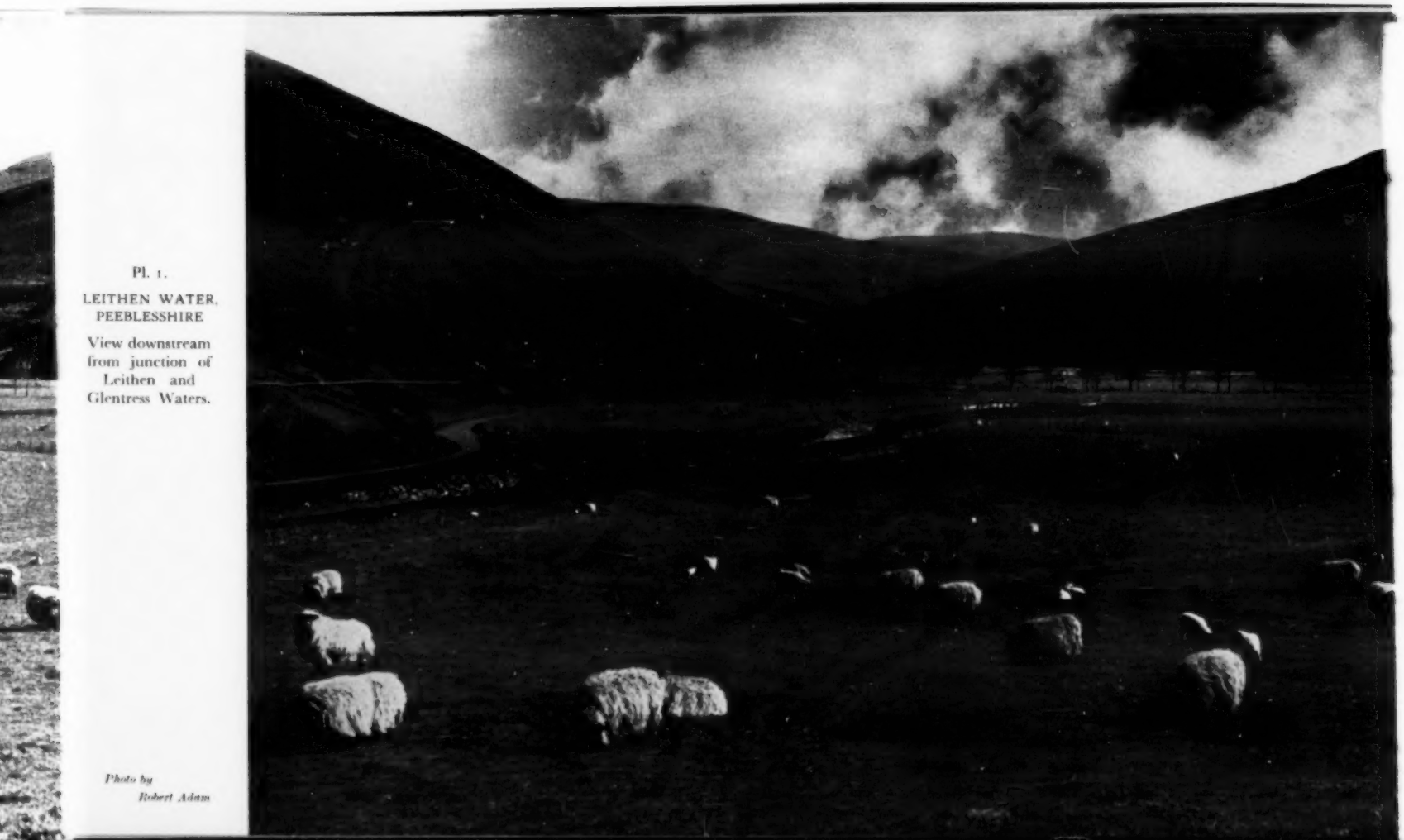
A left-bank tributary of the River Tweed, the Leithen Water bites deeply into the laminated grits and shales of the Moorfoot Plateau and with its tributary the Glentress provides one of the several—though in this case, minor—north-south through valleys breaching that upland rim which separates the middle Tweed Valley and the Merse from Central Scotland : it is followed by a secondary road from Heriot to Innerleithen.

Its form, deep narrow and enclosed, is characteristic of many of the valleys which dissect the Eastern Southern Uplands. The wide swinging valley with interlocking spurs has a flat floor across which the river, small in comparison to the depth and width of the valley, meanders. Smooth convex slopes rise sharply from the valley floor—here at 750 feet to gently rounded or flat-topped summit ridges at 1,800-2,000 feet.

The permanent pasture of the flat haugh land—though liable to flooding—provides early spring grazing for Blackface ewes and their lambs. These constitute the most important product of the upland areas. Improved land is restricted to the valley floor and to a few areas of more favourable slope and soil on the valley sides (mid-distance, right and left banks) where it may extend as high as 1,000 feet. The mainstay, therefore, of these hardy hill sheep throughout the year is the unimproved moorland vegetation which clothes the surrounding hill slopes. Composed of an irregular patchwork of heather and poor hill grasses, the latter are gradually replacing, under the influence of constant grazing and regular moor burning, a once more continuous cover of heather. The continual passage of sheep from low to high ground is revealed by sheep tracks which line the slopes. This movement combined with overgrazing and, frequently, overburning has led in places to a destruction of the vegetation cover and the formation of bare erosion scars.

Pl. 2 : Neidpath Castle, Tweed Valley, Peeblesshire

Neidpath Castle, standing on the steep north-bank of the River Tweed, is but one of the many famous Border keeps which guarded strategic points along the ancient east-west route provided by the Tweed valley from Berwick to the Clyde and which survives as a reminder of the long period of strife, associated with both national and internal conflicts, which swept back and forth across this upland area between the North of England and Central Scotland.

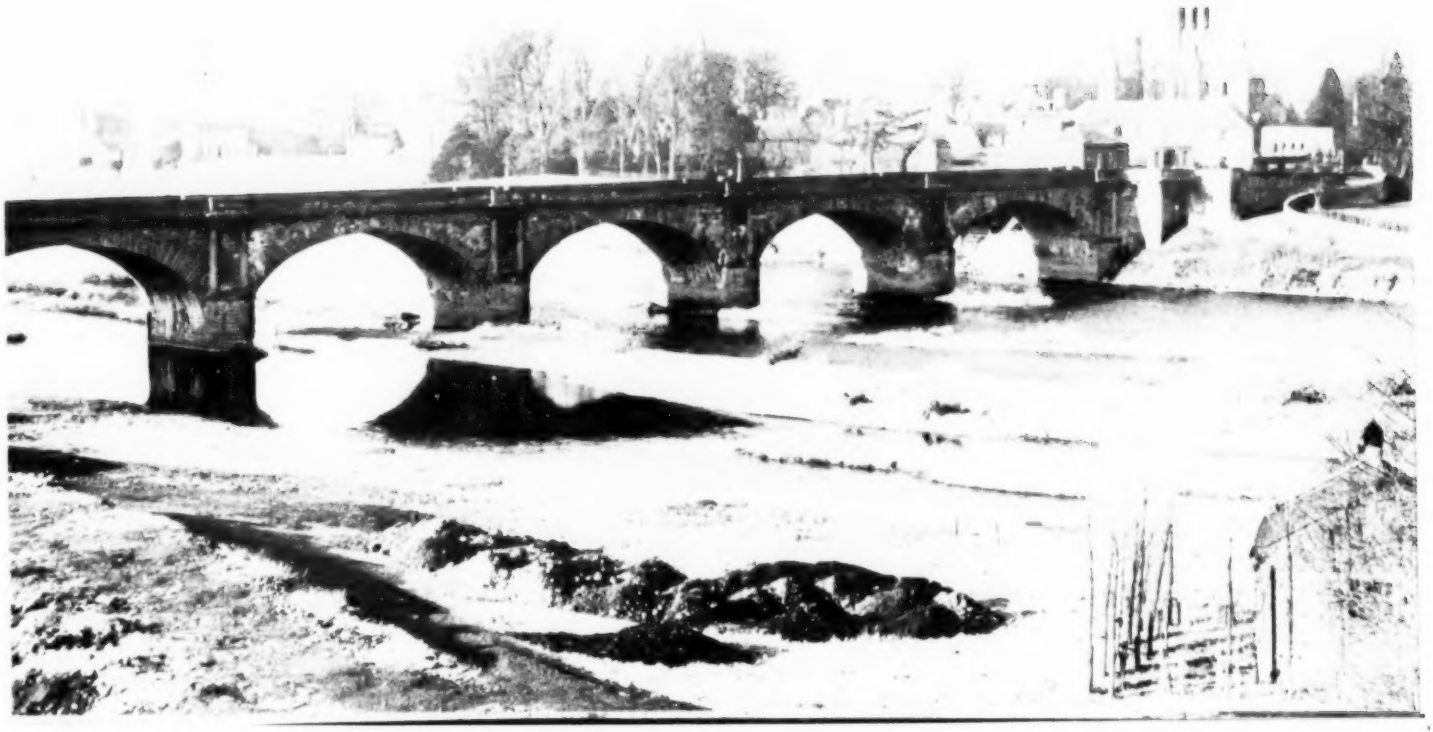


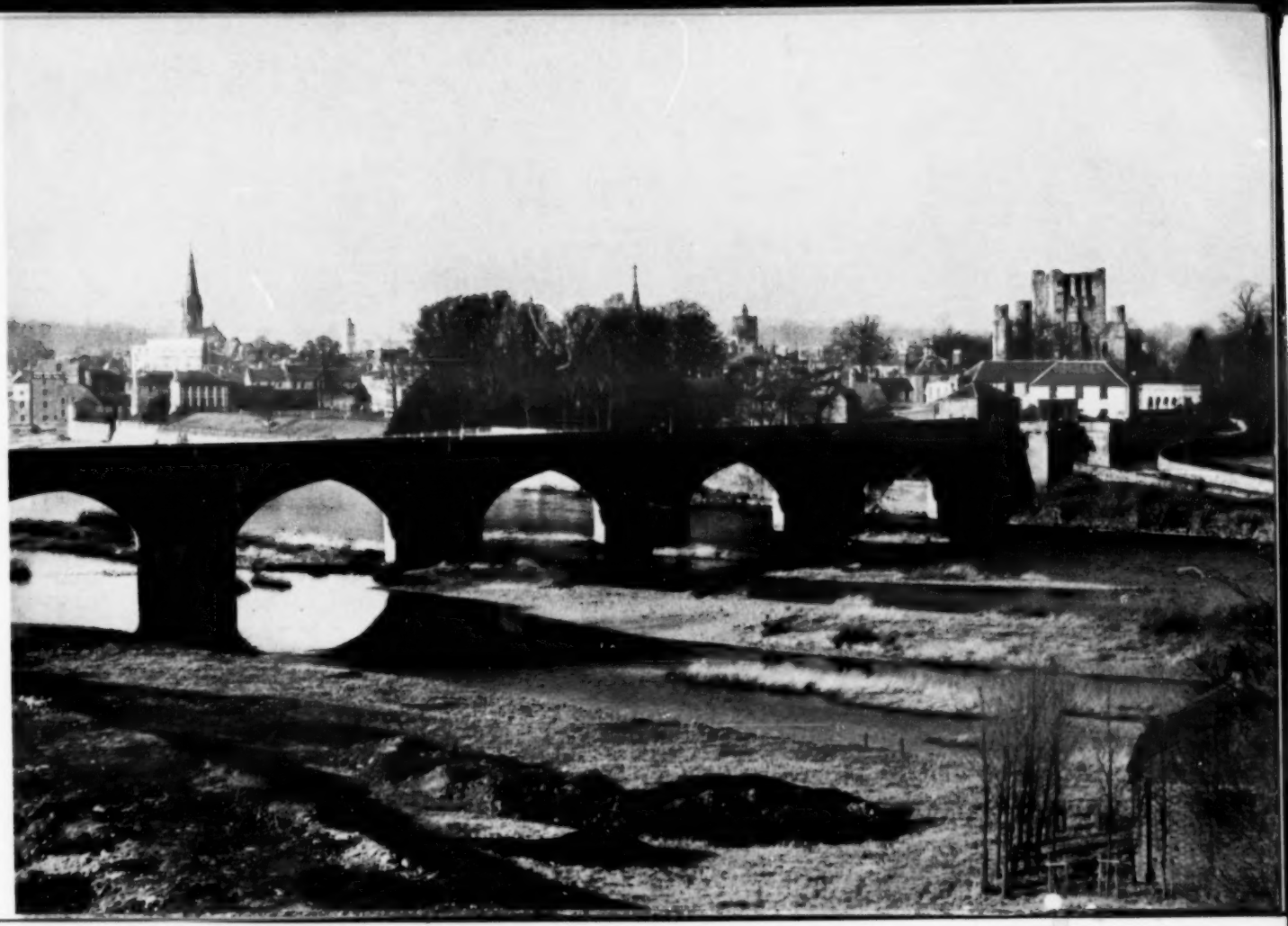
Pl. 1.

LEITHEN WATER, PEEBLESSHIRE

View downstream from junction of Leithen and Glentress Waters.

Photo by Robert Adam





Pl. 4.

KELSO.
BERWICKSHIRE

Photo by
Norward Inglis

The castle, an important stronghold position from very early times, commands the eastern approach to that gorge-like constriction of the Tweed Valley which separates the wide strath, in which Peebles on the east is sited from that with Stobo as its centre in the west. Of the original massive square tower built in the fifteenth century, only the north wall now remains ; ruins of the rest may be distinguished to the right of the existing structure. Most of the present building is a later reconstruction of the original material in the Scottish baronial style of the late eighteenth and nineteenth centuries.

Steep slopes, rising from 600 to 1,200 feet, and shallow soils developed on metamorphosed grits and shales preclude arable cultivation. Below the moorland hill grazings, a plantation of larch and Scots pine reflects a more modern and more peaceful use of this well-drained, sheltered and south-facing site.

Pl. 3 : Galashiels : a view north-westwards up the Gala Water

Lying in the narrow Gala Water above its confluence with the River Tweed, at the zone of contact between the upland rim and the lowlands of the Merse, Galashiels is characteristic of the woollen towns of the Borders : an important agricultural market town consequent upon its position : an industrial centre based originally on the two main resources of the uplands—wool and water.

The tall chimneys of the woollen mills, which dominate this pleasant little town, still follow the line of the Gala on whose water power their initiation originally depended. The subsequent elongation and congestion of the town has been conditioned by a narrow valley hemmed in by steep slopes. This congestion is aggravated by the fact that the Gala Water provides an important north-south route through the Southern Uplands, followed today by one of the main Edinburgh-Carlisle railway (the Waverley) lines and a road. More modern housing developments have, in consequence, been forced to spread upwards on to the terraces and benches on either side of the valley. The surrounding low plateau (1,000 feet in the north-west, dropping to 750 feet in the south-east) into which the Gala Valley is cut, separates the high moorland, upstream, from the lowlands further south and south-east and represents a zone of transition between the hill sheep region and that of arable farming : on its lower parts, improved land is enclosed in a pattern of large fields by hedges and shelter belts and is separated by stone dykes (head dykes) from the higher unimproved heather moorland. The highest enclosed fields now invaded by, or in the process of invasion by, heather indicate a slight recession from a former extension of improved land.

Pl. 4 : Kelso, Berwickshire

Sited on a north-bank terrace within one of the wide meander-loops of the broad, braided, gently flowing lower course of the Tweed, Kelso —an ancient monastic settlement and market centre—is an important

focal-point and bridge-town at the gateway to the fat agricultural lowlands of the Merse. Its strategic importance is reflected in its prominence in medieval Scottish history.

The ruins of Kelso Abbey—a Benedictine foundation which was settled here in the early twelfth century by David I—are a reminder of the long tradition of pastoral and arable farming associated with this and other Border Abbeys. The grain mill is also a reminder of the rich arable land surrounding the town and of Kelso's even greater importance as a grain market in the fifteenth century.

The present town lies west of the ruins of the abbey with more recent developments to the north, and particularly north-west along the main road which strikes towards the Leader valley and the route it offers across the Southern Uplands. Several routes converge on this important crossing point of the Tweed—spanned by a bridge built in 1802 from a design by Rennie.

CONTRIBUTORS TO *S.G.M.*, VOL. 73, NO. 1. APRIL 1957

H. J. FLEURE, F.R.S., Emeritus Professor of Geography of the University of Manchester.

L. J. JAY.—Department of Education, University of Sheffield.

GORDON MANLEY.—Professor of Geography, Bedford College, University of London.

ROY E. H. MELLOR.—Department of Extra-Mural Studies, University of Aberdeen.

C. J. ROBERTSON.—Department of Geography, University of Edinburgh.

NEWBIGIN PRIZE

A Bronze Medal and a Money Prize will be awarded for the best Essay, suitable for publication in *The Scottish Geographical Magazine* and not exceeding 7,000 words in length, on any subject relating to the geography of Scotland.

Essays, typed and with any illustrations prepared for reproduction, in envelopes marked "Newbigin Prize", should be lodged with the Secretary, Royal Scottish Geographical Society, Synod Hall, Edinburgh 1, on or before 31st October 1957.

PIONEER SETTLEMENT ON THE DARLING DOWNS

A SCOTTISH CONTRIBUTION TO AUSTRALIAN COLONISATION

L. J. Jay

There is a distinct family likeness about features of the first British settlement in New South Wales and the daughter-settlement six hundred miles to northward which subsequently grew into the colony of Queensland. Both Sydney and Brisbane were founded as penal establishments under a military rule on the shores of unexplored territory, suffered in their early formative years from the restrictive effects of their assigned status and were dependent on lengthy lines of communication by sea for sustenance. On the landward side physical barriers reinforced this remoteness of location, for about eighty miles due west of each town the crest of the Main Dividing Range rose precipitously by heavily timbered slopes. Yet parent and offspring alike survived these handicaps of lowly birth and cribbed childhood, for each in time became the largest town and the administrative capital of its own colony. Beyond this, however, it would not be wise to pursue the parallel, if only because the generation which separated their respective beginnings created a distinct inheritance for Brisbane. A full quarter of a century elapsed from the hoisting of the Union Jack on the shores of Sydney Cove in 1788 to the discovery of the rolling plains which lay beyond the Blue Mountains on the interior slopes of the Main Range ; farther north, in the latitude of Brisbane, the Darling Downs lying west of the Divide were discovered less than three years after the establishment of a gaol at Moreton Bay, and were occupied by pioneer pastoralists some time before free settlement had been sanctioned in the neighbourhood of Brisbane.

To Allan Cunningham, Botanist to the Government of New South Wales, belongs properly the credit for the discovery and naming of the Darling Downs, together with the earliest appreciation of their geographical position and economic potentialities. Cunningham, whose father was a native of Renfrewshire, left a solicitor's office in London to work for the Superintendent of Kew Gardens. Here he made the acquaintance of another Scot, Robert Brown, who had sailed as Botanist on the *Investigator* with Matthew Flinders during the circumnavigation of Australia.[1] Upon completing a botanical expedition to Brazil, Cunningham was sent to New South Wales, where he landed at Port Jackson in 1816, little more than a year after Governor Lachlan Macquarie had ridden westwards along the newly discovered track over the Blue Mountains to inaugurate the nascent township of Bathurst. The crossing of the Main Divide, coupled with John Macarthur's successful experiments in sheep-breeding, ushered in a period of vigorous exploration and expansion of settlement in which Cunningham played a not inconspicuous part. In 1823 he found a practicable route for stock northwards from Bathurst through a gap (to which he gave

the name Pandora Pass) in the Warrumbungle Range on to the Liverpool Plains—a fine stretch of pastoral country which had been discovered a few years earlier by John Oxley, Surveyor-General of New South Wales. In the following year he accompanied Oxley to Moreton Bay for the founding of a new convict establishment at Brisbane, and together the two men ascended the Brisbane river by boat for fourteen miles beyond the point reached by Oxley in 1823.[2] These journeys constituted the essential preliminary to the longest and most valuable of the land explorations led by Cunningham—the expedition of 1827 which culminated in the discovery of the Darling Downs.

Cunningham set out from the upper reaches of the Hunter River in April 1827 on a northerly course which lay over and beyond the Liverpool Plains. (Fig. 1). He crossed the rivers Namoi, Gwydir and Dumaresq, all westward-flowing tributaries of the Darling, and his Report stresses repeatedly the arid character and difficult nature of the traverse, features which, no doubt, enhanced the well-watered and level appearance of the extensive open plains reached early in June. " These extensive tracts of open country, which I subsequently named (by permission) Darling Downs, in honour of His Excellency the Governor, are situate in or about the mean parallel of 28° 8′ South, along which they extend east 18 miles to the meridian of 152 degrees. . . . The lower parts, by a deeply grooved water course, form flats, which in consequence of their permanent moisture, furnish a very considerable range of cattle pasture at all seasons of the year—the grasses and herbage exhibiting generally in the depth of winter an extraordinary luxuriance of growth. . . .

" From these central grounds rise downs of a rich black and dry soil, which extend several miles to the eastward, and as they furnish an abundance of grass, and are conveniently watered, yet perfectly beyond the reach of those irrigations which take place on the flats in wet seasons, they constitute a most valuable sound sheep pasture. . . ."[3]

The full description of these plains was destined to influence the direction and pace of pastoral expansion in New South Wales for a generation to follow. From the maps which Cunningham sketched during this expedition it is apparent that the area which he designated the Darling Downs was restricted to the drainage basin of the upper Condamine, south of Dalrymple Creek (Fig. 2), but the appellation was subsequently extended by others to embrace the lands drained by the lower Condamine, *i.e.* farther north and west. This larger area was defined as the Darling Downs Pastoral District in 1848, and popular usage has since confirmed this title to the land bounded on the north and east by the crest of the Main Dividing Range, and on the south by the Macintyre river ; inland it reached approximately to the meridian of 149° East. The broad, shallow valleys and gentle ridges of the Downs decrease in altitude westwards ; structurally they form a tableland of roughly horizontal strata dipping gently towards the interior from an eastern rim which is at an elevation of about 2,000 feet. In marked contrast to this gently undulating topography, a range of volcanic peaks rises abruptly to 4,000 feet on the extreme south-eastern margin, near the headwaters of the Condamine.

Cunningham halted at the foot of the Main Range close to these volcanic peaks, unwilling to proceed much further because supplies were dwindling and his horses becoming weary. Nevertheless before turning back he climbed to a high vantage point and observed what he thought might be a gap through to the coast ; he estimated that he was then about seventy-five miles south-west of the penal settlement at Moreton Bay. He began his return journey on the 16th of June and reached the Hunter Valley after an absence of three months. To set the seal on this notable achievement he sailed to Moreton Bay in 1828, explored the country between Brisbane and the Dividing Range to the south-west, and successfully located the gap which he had seen from the west side of the Range the previous year, and which to this day is identified by his name.

In view of the close connexion which existed between exploratory journeys and the extension of settlement in Australia during the major part of the nineteenth century, it may at first appear strange that thirteen years should elapse from the discovery by Cunningham of the Darling Downs to the arrival upon them of the first British settlers. Cunningham's Report was read widely, and his favourable comments on the potentialities for stock-rearing of the upper Condamine country were freely quoted in published topographical works popular at that time.[4] An explanation for the delay must accordingly be sought elsewhere. Primarily it reflected the tedious length and difficult traverse of the overland journey from the settled area around Sydney to the Darling Downs, intensified by the physical and human obstacles which hindered the alternative approach by sea. For although Cunningham, with commendable perseverance, had established the relationship between the Downs on the west of the Dividing Range and the area draining eastwards to Moreton Bay, his Gap breached a formidable scarp on the seaward face of the Main Range, where the tilted rim of the Downs tableland overlooks the depression of the Fassifern lowland less than 600 feet above sea level.[5] Furthermore, the approach by sea required an official permit to disembark at Brisbane where the presence of a gaol inhibited normal development for eighteen years.[6] It must also be remembered that the extension of settlement by land in the direction of the Downs was a variable depending on the rate of occupation of other, more readily accessible lands which lay in the sector west and south from Bathurst ; not until advances in these latter directions were halted was there a compensatory surge of settlement northwards.

In its initial stages this centrifugal movement of pastoralists was viewed with disfavour by the British Government ; accordingly, in order to concentrate population and resources within manageable limits, Governor Darling in 1829 proclaimed the Nineteen Settled Counties. These extended around Sydney for a radius of about 150 miles, from the Manning river in the north to the Lachlan in the west and the Moruya river in the south (Fig. 1). Beyond them settlement was not recognized and indeed, was expressly forbidden. Yet so compelling was the urge to seek wider pastures for sheep, that within a year of Darling's proclamation stockmen were driving their flocks

Fig. 1. The way to the north.

1. Route of Cunningham's expedition in 1827.

2. Limits of the Nineteen Settled Counties, proclaimed in 1829.

Height of land: 3. 500-1,000 ft.: 4. 1,000-2,000 ft.: 5. over 2,000 ft. CG—Cunningham's Pass. PP—Pandora Pass.

beyond the limits of location, and were ' squatting ' on land to which they had no title. In the early eighteen-thirties the advance northwards from the Settled Counties was stimulated by the enterprise of the Australian Agricultural Company which had received extensive alienations of land covering the Liverpool Plains ; surveyors employed by this Company revealed the nature of the rugged uplands lying between the Hunter and the Hastings rivers, thereby opening up the route to the plateaux of New England. A Scot, Semphill from Edinburgh, moved from the Hunter in 1832 and settled at Walcha ; in the next three years stockmen advanced slowly towards Armidale. Another Scot, Peter McIntyre, climbed to Guyra in 1836 to occupy land above the 4,000-foot contour, and about the same time Alexander Campbell took up a run at Inverell on the western side of Ben Lomond (Fig. 1). Meanwhile the exploratory journey of Sir Thomas Mitchell in 1836 revealed magnificent pastoral country lying between the Murray river and Bass Strait, land which he enthusiastically named ' Australia Felix ' ; this diverted attention to the south at a time when the extension of settlement westwards from the Settled Counties had been arrested by the increasing aridity of the interior plains. This counter-attraction, combined with the difficulty of conquering the highlands of New England, delayed, but could not halt indefinitely, the advance north towards the Darling Downs.[7]

In January 1840 John (' Tinker ') Campbell moved his cattle from the Gwydir valley, where his run was challenged, and established himself at Bebo on the north bank of the Dumaresq river, thus giving himself the title of the first squatter to settle in the future colony of Queensland.[8] Two months later Patrick Leslie passed Campbell's station on the way north, crossed the ridge which divides the Dumaresq drainage from that of the Condamine, and selected at Toolburra the first station upon the Darling Downs. Leslie was one of ten Aberdonians who emigrated to Australia in the late eighteen-thirties under the inspired leadership of Ernest Elphinstone Dalrymple, a young officer in a Highland regiment stationed in India, who sold his Army commission in order to try his fortune in Australia.[9] The Leslie brothers had begun farming in the southern hemisphere at Parramatta, subsequently moving to Collaroi near the headwaters of the Hunter. Lured by the prospect of better land farther north they entered New England and spent four days in a vain attempt to discover a road down to the Clarence river, before making tracks towards the Darling Downs. Whilst preparing in Sydney for this journey Patrick Leslie had received from Allan Cunningham full particulars of the route followed by that explorer in 1827, and had been offered the use of Cunningham's original map, which had passed into the hands of Admiral King. Unfortunately, the map could not be found, so Leslie had to rely for guidance on the location of Ben Lomond, which King described to him.[10]

After a preliminary reconnaissance of the Downs as far north as Gowrie Creek, Patrick and Walter Leslie took possession of all the country from the bottom of Toolburra to the headwaters of the Condamine, including all tributary creeks—" enough to form a principality "

as John Campbell drily observed—but this vast holding was rapidly reduced in size as squatters moved on to the Downs along Leslie's "marked-tree line". Within three months Arthur Hodgson and Gilbert Elliot had been persuaded by Patrick Leslie to take up a run on the Downs in preference to the Clarence river and they settled at Eton Vale, on Hodgson Creek, near to the modern railway station of Cambooya. Close in their wake came King and Sibley to form Clifton station on King Creek, Hughes and Isaac squatted on the banks of Gowrie Creek and John Campbell moved from Bebo to Westbrook. These were the pioneer settlers in the northern part of the Downs. Meanwhile the Leslies had divided their holding; Patrick and Walter remained at Toolburra whilst their brother George took

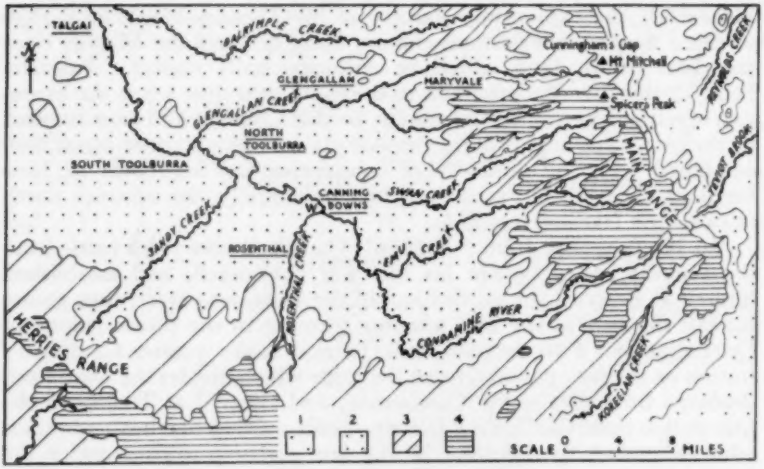


Fig. 2. The upper Condamine country.

Names of early squatting stations mentioned in text are underlined. W—Warick Town. Height of land: 1. 600 to 1,200 ft: 2. 1,200 to 1,800 ft: 3. 1,800 to 2,400 ft: 4. 2,400 ft.

up Canning Downs to the east, with Sandy Creek forming the boundary between the two runs (Fig. 2). Their nearest neighbours were Colin and Archibald Campbell who selected Glengallan on the creek of that name, and Ernest Dalrymple, who chose Talgai, where Dalrymple Creek joins the Condamine. A few years later, part of Talgai was acquired by George and John Gammie who had emigrated from Aberdeen with the Leslies. The removal of the penal establishment from Moreton Bay in 1842 facilitated entry to the Downs by way of Brisbane and Cunningham's Gap, an alternative route favoured by some, particularly the womenfolk, in preference to the long overland journey. In addition, there was a movement of men and stock in an easterly direction over the Main Range, noticeably by squatters of the second wave of invasion who, finding that the best land on the Downs had already been taken up, elected to cross into the Moreton

Bay region drained by the Brisbane and Logan Rivers. In this way the brothers Macquarie and Campbell Macdonald settled on the banks of Teviot Brook, near the modern Boonah, whilst Cameron and Coulson, who had taken up Maryvale near Spicer's Peak, drove their flocks through the Gap and established a station at Fassifern on the banks of Reynolds Creek, a few miles north of the Macdonalds. So vigorous was this overspill movement that within a few years the Moreton District filled up, compelling later arrivals to move north across the watershed of the Brisbane into the lands drained by the Mary and Burnett rivers.[11] The major deflections of course which they took to reach their ultimate destination emphasise the power of the Darling Downs to attract and then to disperse immigrant pastoralists.

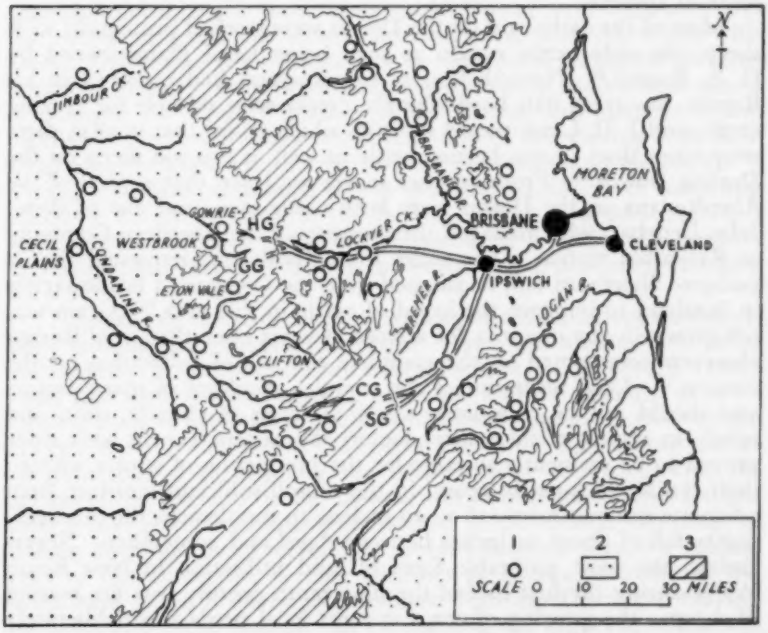


Fig. 3. Early squatting stations and routes across the Range.

1. Stations in 1845: Height of land: 2. 656-1,640 ft: 3. over 1,640 ft. Gaps: CG–Cunningham's: GG–Gorman's: HG–Hodgson's: SG–Spicer's Peak.

NOTE.—The distribution of stations in the Moreton District, *i.e.* east of the Main Range, revises the pattern of an earlier map by the present writer, in the light of further evidence.

In piecing together the story of pioneer settlement in the area, one is impressed by the restlessness and mobility of the earliest arrivals. Stations changed ownership with bewildering frequency, runs were sub-divided to accommodate newcomers, and men moved across mountains to seek new grazing grounds with a nonchalant disregard for physical obstacles. For this reason, Figure 3, which shows the

distribution of stations in 1845, has the unreal character of a still-picture produced by arresting the action of a moving film ; nevertheless it offers an approximate guide to the extent and direction of settlement at an early stage.[12] Favourite sites were the banks of the Condamine and its right-bank tributaries, as far down as Jimbour Creek, beyond which the character of the country altered and standing water was less plentiful. West of Cecil Plains the rainfall decreased both in amount and reliability, and settlements were fewer in consequence. East of the Main Range, where the annual rainfall exceeded 30 inches, most of the early stations were located near to one of three river systems ; the upper Brisbane and its powerful tributary, the Stanley ; Lockyer Creek in the latitude of Brisbane Town ; and the Logan country south of Ipswich.

Most of the early runs on the Downs were stocked principally with sheep, the only cattle station as such being Cecil Plains owned by H. S. Russell.[13] Nevertheless, as Cunningham had observed in his Report, low-lying flats bordering the creeks were suitable for grazing cattle, and J. D. Lang quoted statistics which reveal that in 1845 there were more than 14,000 horned cattle as well as 210,000 sheep on the Darling Downs.[14] From another source we learn that several of the Aberdonians on the Downs were keen cattle-men, and one of these, John Deuchar, who managed the property of the Aberdeen Company at Rosenthal station a few miles from Toolburra, requested that a pedigree Shorthorn bull be shipped from the Company's headquarters in Scotland to improve the breed of cattle in this area.[15] Grain was not grown in any quantity for a score of years after 1840, and foreign observers commented on the complete absence of cultivation on the stations.[16] Land utilisation is the complex resultant of many factors and should not be considered solely in terms of climate, soils, and relief—in respect of these three factors the eastern Downs have since proved to be eminently suitable for the production of winter wheat ; their fertile black-earths retain in the subsoil sufficient moisture from adequate summer rains (16 to 20 inches) to supplement the relatively scanty fall of about 10 inches between April and September. Nevertheless, the most profitable form of land utilisation in New South Wales during the first half of the nineteenth century was the rearing of sheep ; the growing of crops to meet local needs was deliberately discouraged, and Australians were prepared to pay for foreign grain from the profits of the wool-clip. The export of wool, hides and tallow —all of which could withstand the long journey to northern markets— and the import of cheap grain from Asia and South America, were part of the accepted economy of Australia at that time, with few dissentient voices.

Lacking ploughed land or fenced fields the scenery of the Downs did not alter appreciably for many years. The station owner or manager lived in a homestead built of slab walls made from local timber, with a bark roof, stone fireplace, and the minimum of crudely fashioned or improvised furniture. Smaller huts of wood were erected about ten miles from the head station, each with two shepherds to tend the flocks by day ; a hutkeeper guarded them at night, when

the animals were penned in temporary yards enclosed by hurdles made of split palings which could be moved and re-erected on fresh ground as required. In view of the difficult conditions of life and work, it is remarkable that so many of the pioneer squatters were men of good birth, education and social standing. Ernest Dalrymple was the sixth son of a Scottish baronet ; Arthur (afterwards Sir Arthur) Hodgson had attended Eton and Cambridge University and subsequently held Ministerial office in the Queensland Government ; his partner, Gilbert Elliot (whose Scottish birthplace is commemorated in Mount Rubieslaw, a hill overlooking their station at Eton Vale), had been Aide-de-Camp to Governor Gipps, and several others, including Henry Stuart Russell, were graduates of Oxford or Cambridge. A high proportion of the early pastoralists on the Downs were Scotsmen, and the names of several of those who emigrated from Aberdeen with Ernest Dalrymple recur frequently in descriptive accounts of these formative years.[17] Despite the term 'squattocracy', which was coined to describe the wealthy graziers of the 'sixties, the pioneers of the eighteen-forties lived a very democratic way of life, sharing with their hired men the same sordid existence of "monotony and mutton fat". This in part was occasioned by the perennial difficulty of recruiting adequate labour for work in the Downs, and H. S. Russell recorded with truth in his lively book of reminiscences, "Shepherds, bullock-drivers and hut-keepers were pets in our isolated dependence, and they knew it."[18]

The early occupants of the Downs encountered numerous hardships, both natural and economic in origin. Foremost among these were scab among the sheep, uncertain rainfall, scarcity of circulating money (only four squatters had banking accounts) and the difficulty of overlanding stock to the nearest market—Maitland, 500 miles away on the Hunter River—with severe drought affecting the intervening plains. An economic crisis affecting the whole colony coincided with the arrival of the pioneers on the Downs, and at one period wool fetched such a low price that squatters resorted to the drastic expedient of boiling down fat sheep for tallow. John Campbell played a leading part in this enterprise, renting premises at Kangaroo Point on the south bank of the Brisbane river opposite Brisbane Town, and making his casks from local timbers. In his opinion, the export of tallow was the turning-point which saved the squatters in the mid-forties.[19] Attempts were made to start a boiling-down works at Glencoe, near Warwick, but it was found cheaper to walk the stock over the Range to establishments at Ipswich or Brisbane. This example illustrates the remoteness and difficulty of access which aggravated all the other hardships of the time. Cunningham's Gap was incredibly steep and impassable for drays ; moreover its use entailed a lengthy detour for settlers on the northern Downs. One of these, Arthur Hodgson, crossed the Main Range within a few weeks of his arrival at Eton Vale, and was cordially entertained in Brisbane by Lt Gorman, the last military commandant of the penal settlement. The friendly relations established by this visit prompted Gorman to seek a more direct route over the Main Range, and using a dray specially con-

structed for the purpose, he blazed a new track up Flagstone creek and over the crest of the Divide near to Eton Vale. Soon afterwards Hodgson's partner utilised this route to get his drays on to the Downs from Brisbane, but, although shorter than the way through Cunningham's Gap, the ascent was almost as precipitous and Elliott christened it " Hell's Hole ", an epithet which survives today in the name of the tributary of Flagstone Creek by which the road approached the Downs (Fig. 4).

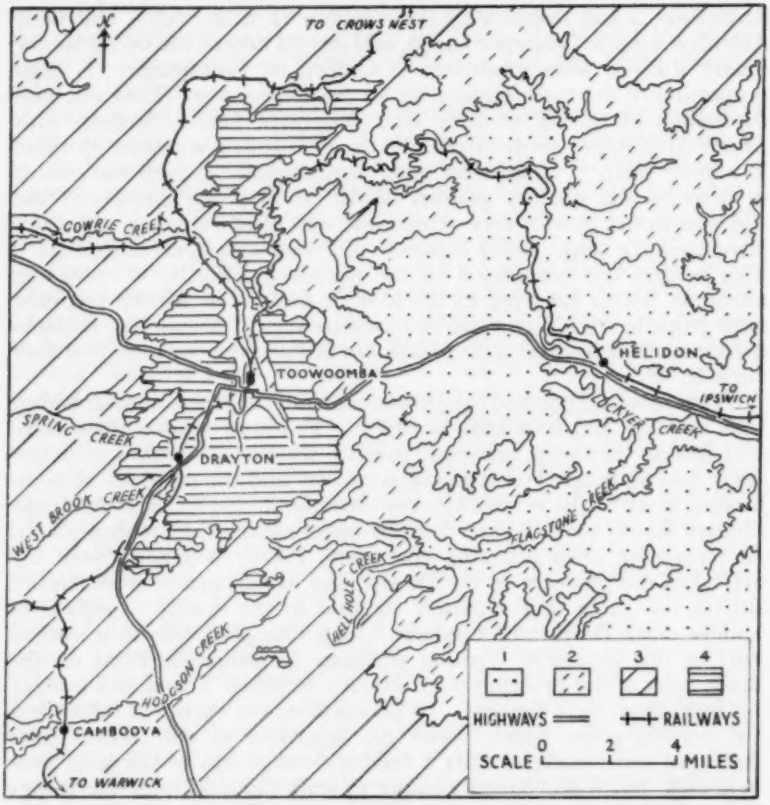


Fig. 4. The site of Toowoomba

Height of land : 1. 500 to 1,000 ft : 2. 1,000 to 1,500 ft : 3. 1,500 to 2,000 ft : 4. Over 2,000 ft.

An alternative route to Gorman's Gap was accordingly sought, once more on the initiative of Hodgson. Early in 1842 combined operations by a task-force of squatters from six stations on the northern Downs succeeded in cutting and clearing a track, barely the width of a dray, through dense scrub. This route (which might be said to follow Hodgson's Gap in order to distinguish it from the others),

crossed the Main Range a few miles north of Gorman's Gap, commencing at the head of Westbrook creek, near the place known as the Springs, which later became the township of Drayton, through the Swamp—subsequently called Toowoomba—and thence along an easterly spur to Helidon on Lockyer Creek. Once constructed, this track "left Hell's Hole in obscurity" and became the principal route for traffic between the northern Downs and Brisbane. Today it is followed by the Main Western Highway of Southern Queensland.

Meanwhile, stations farther south in the upper Condamine country continued to use Cunningham's Gap until 1847, when Henry Alphen, a stockman employed at Canning Downs, discovered and marked a track over the Range three miles south-east of Cunningham's Gap, separated from the latter by Mount Mitchell, and with Spicer's Peak on its southern flank (Fig. 2). Patrick Leslie and neighbouring station owners inspected and approved the route, the New South Wales Government gave financial support, and the track was cleared under Leslie's supervision. After Separation in 1859 the Queensland government expended large sums of money on improvements to this route which offered a valuable alternative to Cunningham's Gap, although in recent years the latter has been preferred for the main motor road between Brisbane and the southern Downs.[20]

One consequence of the increasing number of tracks made to link the region with Brisbane across the Main Range, was the emergence of townships at focal points in the network of communications. It was therefore, no mere coincidence that in the year when Henry Alphen discovered Spicer's Peak Gap the Government of New South Wales requested Patrick Leslie to choose a suitable site for the first township on the Darling Downs. He favoured that part of his brother's station on the south bank of the Condamine where Rosenthal Creek enters the main stream. The original site occupied Hudson's Hill and the lower land to northward, but the latter was liable to flooding in wet seasons and so the nucleus gradually shifted westwards to higher ground. Warwick was gazetted in 1849 and designed by J. C. Burnett, surveyor, who named the first streets. For more than a dozen years afterwards, however, it contained nothing more pretentious than a handful of bark huts, and when Anthony Trollope visited the Downs in 1871 he found Warwick ". . . unfinished, parallelogrammic, and monotonous; and the mountains are just too far from it to give it any attraction as is also the sluggish Condamine river."[21] Yet although devoid of charm, Warwick possessed certain advantages of location, as Figure 2 reveals. It was centrally situated in the upper Condamine country—the historic Darling Downs of Allan Cunningham—within convenient reach of half-a-dozen important properties, and near a crossing of the main waterway where the track from New England and the south divided, one branch leading to stations on the northern Downs, while the other turned eastwards up the valley of Glengallan Creek to cross the watershed into the Moreton District.

Two years after Patrick Leslie had selected the site of Warwick, plans were prepared for a second township on the Darling Downs, to serve the needs of the northern squatters who utilised Hodgson's Gap.

The site of Drayton township was known locally as the 'Springs', and lay near the source of Westbrook creek at the start of the road over the Range (Fig. 4). Within a few years, however, Assistant-Surveyor Moriarty wrote to the Surveyor-General of New South Wales, demonstrating the superiority of an alternative site a few miles north-east of Drayton, on the source of Gowrie Creek: "The Swamp possesses many advantages for a township which Drayton does not. The soil is exceedingly rich, the ground level, and there is abundance of water and finest timber for building. Drayton on the contrary is built on a number of ravines and ridges, and possesses no permanent water. . . ."[22] Both sites had been surveyed in 1849 by the same J. C. Burnett who had recently designed the street-plan of Warwick.[23] The rival claims of the 'Springs' and the 'Swamp' were pressed for several years, with the latter steadily gaining in importance despite the unpropitious sound of its name. Early in 1858 the Swamp became known as Toowoomba, by which time it had a population approaching 1,000—twice as many as Drayton. This superiority was subsequently established beyond recall when the Government of Queensland selected Toowoomba as the node for a network of railways to serve the Darling Downs.

Danger and discomfort are features of life in any pioneer fringe of settlement, and although these hardships were philosophically faced by the men who moved to the Downs of their own volition, they were avoided by those less venturesome in spirit who could find more congenial employment elsewhere. The pastoral occupation of the Condamine country began in the same year that transportation of convicts to New South Wales officially ended, and although Leslie established his station at Toolburra with the aid of trusted ticket-of-leave men, this source of labour soon ran dry. The opening of the Moreton District to free settlers after 1842 gave little aid to the squatters, for very few immigrants chose dreary employment as shepherds on remote runs in preference to more congenial openings for artisans nearer their port of entry. This situation was aggravated after the discovery of gold at Bathurst in 1851, for this deprived the Moreton District of many labourers who rushed south to the diggings. Several years passed before the lure of gold in Queensland reversed the trend of this migration.

During the eighteen-fifties the most northerly settled areas of New South Wales were united in a growing agitation for separation from the parent colony, but beyond this demand they were divided over the question of renewing convict transportation to eastern Australia. The residents of Brisbane and other settlements along the coastal plain resented the stigma of convictism and stoutly opposed its revival, but it seemed to the squatters that transportation might provide them with a supply of labour when all other sources had failed. This cleavage of opinion between Town and Down found expression in rival newspapers; the *Moreton Bay Courier*, published in Brisbane, was strongly opposed to convictism whilst the mouthpiece of the squatters was the *Moreton Bay Free Press*, emanating from Ipswich.[24] The same rivalry underlay the curious attempt by the squatters to champion

Cleveland, on the shores of Moreton Bay, as a potential alternative to Brisbane for the export of produce from the Darling Downs.[25] With the passage of time it became evident that Cleveland could not hope to emulate the advantages possessed by Brisbane, and in similar fashion the demand for a renewal of convict transportation failed to recruit sufficient support. The move for ' Separation ' gained strength in consequence.

When eventually the northern districts of New South Wales were excised in 1859, the Moreton District was the most thickly peopled part, and the Darling Downs were economically the most important area, in the newly created colony of Queensland. The census returns of April 1861 reveal that more than half of the total population of 30,059 lived in the towns and rural districts of the coastal plains. Of the settlements west of the Great Dividing Range only Toowoomba (1,183) and Warwick (1,180) possessed more than a few hundred inhabitants, the other leading towns in size being Brisbane (6,051), Ipswich (3,601), Rockhampton (698) and Maryborough (641). Brisbane was the pre-eminent port of entry and egress for people and produce, and easily the most important export was wool (worth £369,000), followed by much smaller quantities by value of tallow, hides, fruit, gold and sheepskins, in that order. Flour, wheat and maize figured prominently among the imports, reflecting the poor state of agriculture in the colony generally. In 1861 there were under 200 acres of wheat grown in the whole of Queensland ; significantly enough more than three-quarters of this acreage was around Warwick.[26]

One of the most urgent tasks confronting the newly formed Government of Queensland was that of improving the means of communication between the coast and the vast grazing lands of the interior, for at Separation the squatters, contributing 70 per cent of the revenue and almost 94 per cent of exports, were the only productive interest in the colony. Within a few years a Railways Act was passed, and on the 31st of July 1865 the first section of track in the colony was opened for traffic.[27] It ran for twenty-one miles westward from Ipswich and within two years the line had been extended by a circuitous route up the steep face of the Main Range to Toowoomba (Fig. 4). By 1888 the expanding network of railways in southern Queensland had linked up with that of New South Wales, and the line from Brisbane to Sydney, via Toowoomba, had been constructed with a break of gauge on the border at Wallangarra, fifty miles south of Warwick. Henceforth the Darling Downs were no longer on the outer edge of settlement in eastern Australia, but astride the main rail route connecting two colonial capitals.

The advent of railways initiated new trends in the development of the Darling Downs. During the quarter of a century from the arrival of Patrick Leslie upon the banks of the Condamine to the construction of the railway track westwards from Ipswich, settlement and economic activity in southern Queensland had been dominated by the importance of sheep and cattle rearing for the export of wool, hides and tallow. Production for export demanded access to the coast, hence the persistent search in the early days for better roads to serve

the region, and the emergence of Warwick and Toowoomba as townships controlling routes across the Range from the southern and northern parts respectively of the Downs. Separation in the 'sixties coincided with new orientations, new activities; population spread beyond the latitude of Brisbane and the Downs, reaching well into the tropics. The exploitation of gold and mineral resources in central Queensland attracted large numbers of immigrants whose presence provided a labour force socially more acceptable than either convicts or coloured men, and a local market for meat and agricultural produce which hitherto had not existed to any appreciable degree. The extension of railways inland from the coast, combined with the exploitation of artesian water in the 'seventies, helped to thrust the limits of pastoral occupation westwards and northwards, whilst the Darling Downs became a different kind of geographical frontier-zone wherein the farming free-selector joined issue with the squatter.[28] The pattern of land utilisation on the Downs was profoundly modified, and rich pastures which in the 'fifties had supported grass growing " as high as a mounted horseman " had been removed, by the end of the century, as a result of overstocking and the introduction of the plough, a fact remarked upon by one of the early settlers in a book filled with wistful retrospections.[29]

The Darling Downs today constitute one of the most prosperous areas of mixed farming in Queensland, carrying large numbers of beef and dairy cattle, pigs and sheep. Here too is the main wheat producing area of the State, forming the most northerly extension of the ' wheat crescent ' which curves on the inner slopes of the Great Dividing Range from South Australia through Victoria and New South Wales into Queensland. It is strange to recall that little more than a century ago reference to a time " when wheat shall grow on the Darling Downs " was an expression current among Australians to describe some extreme improbability, so firmly rooted was the concept of this region as grazing country, and so strong was the discouragement of cultivation, even in areas such as this where physical conditions were known to be favourable.

[1] Serle, P. *Dictionary of Australian Biography.* Vol. 1. Sydney, 1949, pp. 122 and 204.

[2] Lee, Ida. *Early Explorers in Australia.* London, 1925.

[3] Quoted in Russell, H. S. *The Genesis of Queensland.* Sydney, 1888, pp. 107-8.

[4] For example, Martin, R. M. *History of Austral-asia comprising New South Wales, Van Diemen's Land, Swan River, South Australia, etc.* London, 1836, p. 59.

[5] Opinions differ as to whether this escarpment is due to block-faulting or differential erosion. For comments on this problem, see Sussmilch, C. A., The Geomorphology of the Moreton District, Queensland: an interpretation. *Proc. Roy. Soc. Queensland,* 1933, XLIV: 111-114 and Marks, E. O., Some Observations on the Physiography of the Brisbane River and Neighbouring Watersheds. *Ibid.,* p. 146.

[6] Jay, L. J. The Origins and Early Growth of Brisbane, Queensland. *Geography,* 1952. XXXVII (3): 170-173.

[7] Roberts, S. H. *The Squatting Age in Australia 1835-1847.* Melbourne, 1935; especially Chapter VI.

[8] Campbell, J. The Early Settlement of Queensland. *Trans. Bibliographical Soc. Queensland*, 1936. First Series. No. 1.

[9] Hall, T. *The Early History of Warwick District and Pioneers of the Darling Downs.* Toowoomba, *n.d.*, p. 8, *et seq.*

[10] The Diary of Patrick Leslie dated 1878 is printed in Russell, H. S., *op. cit.*, pp. 164-171.

[11] Palmer, H. Reminiscences of the Wide Bay and Burnett Districts, etc. *Queensland Geogr. Journ.*, 1902-3, XVIII, p. 89.

[12] Figure 3 is based on, A List of Persons who have obtained Licences to Depasture Stock beyond the limits of Location. *New South Wales Govt. Gazette*, 18th November, 1845, p. 1294.

[13] Forbes, D. Reminiscences of the Early Days of the present Colony of Queensland, *Queensland Geogr. Journ.*, 1900, XVI, p. 60.

[14] Lang, J. D. *Cooksland in North-eastern Australia.* London, 1847, p. 131.

[15] Hall, T., *op. cit.*, p. 36.

[16] Roberts, S. H., *op. cit.*, p. 429.

[17] See especially Hall, T., *op cit.*, and also Morgan, A. The Discovery and Early Development of the Darling Downs. *Queensland Geogr. Journ.*, 1901-2, XVII, p. 87.

[18] Russell, H. S., *op. cit.*, p. 205.

[19] Campbell, J., *op. cit.*, Section VIII.

[20] Groom, A. *One Mountain after another.* Sydney, 1949, pp. 112-113.

[21] Trollope, A. *Australia and New Zealand.* Vol. 1. London, 1873, p. 115.

[22] Quoted in Tolmie, J. Drayton and Toowoomba—their Early History. *Queensland Geogr. Journ.*, 1903-4, XIX, p. 18.

[23] Born in Scotland in 1815, J. C. Burnett emigrated to Australia with his family and entered Government service there. He was responsible for much valuable survey and exploratory work in the northern districts of New South Wales before the Separation of Queensland.

[24] Knight, J. J. *In the Early Days.* Brisbane, 1895, Ch. XIX.

[25] Jay, L. J., *op. cit.*, pp. 174-177.

[26] *Pugh's Queensland Almanac, Directory and Law Calendar.* Brisbane, 1862, pp. 60-61, 87, and 102.

[27] Cole, A. E. Early History of the Queensland Railways. *Journ. Historical Soc. Queensland.*, 1945, III, p. 284.

[28] Roberts, S. H. *History of Australian Land Settlement, 1788-1920.* Melbourne, 1924. Part IV. especially Chs. 21 and 25.

[29] de Satgé, O. *Pages from the Journal of a Queensland Squatter.* London, 1901, p. 53.

THE CHANGING WORLD: A REVIEW

H. J. Fleure

It is a broad truth that nothing is constant save change and the geographical thinker keeps in mind the perpetual reactions between men and their environments as being, for him, very important aspects of change. He is less concerned with petty oscillations which often loom large in newspapers and needs perspicacity to realise more significant changes which may not be so conspicuous to superficial observers. In this book [1] different contributors attain differing grades of success in their realisation of significance, and in the degree to which they are able to think objectively and not as citizens of a particular country. It is particularly pleasant to feel able to congratulate especially some contributors from overseas, notably Whittlesey (Harvard) on the social historical evolution of U.S.A., Preston James (Syracuse, U.S.A.) on Latin America, and Spate (Canberra) on India. Underlying Preston James' discussion of Latin America is the assumption that a locally self-sufficient economy is an inferior one. This assumption is probably beyond challenge, but at the same time the development of industry has made for the advantage of the large unit which can provide a great deal of what it needs from its own resources of raw material and skill. The rise of U.S.A. and U.S.S.R. to their modern status as leading powers illustrates this, and the transformation of China, now in progress, seems likely to give a further dramatic illustration of the same process. Whether India is likely to be of this distinguished company will depend on certain contingencies, though India's political prestige has grown apace. Spate rightly argues that India's multiplicity of languages and of levels of civilisation makes her problems difficult, and consolidation of landholdings here and elsewhere cannot but increase a landless class with consequent dangers to society. Asia is now self-conscious in new ways.

The open ' secret of England's greatness ' in the nineteenth century was the possession of coal and iron resources worked by native skill with a background of political experience. The twentieth century has given the so-called Middle East new wealth in oil, but lack of native skill in both engineering and political organisation has brought about struggles for power and profit in which Britain has not been very skilful. As a result, her economy is precariously balanced, and a power-vacuum in the Middle East creates many problems that change like the patterns of a kaleidoscope. The fact that the inexhaustibility of resources in U.S.A. may turn out to be a fairy tale makes that great country deeply interested in Mesopotamian-Arabian-Persian oil, while at the same time concerned to give a limited protection to British effort. Whether the power-vacuum can be filled by local efforts is quite unknown ; in the meantime invasion of Egypt by Israel, Britain and France has added momentum to those local efforts.

One of the most general of modern changes is the immense growth of urbanism, and writers in this book properly draw attention to the

difficulty of official statistics which give figures for administrative units rather than population-agglomerates. Athens and Piraeus contribute to an agglomerate that is now near the million level. The ' compulsory' transfer of populations needs to be stigmatised as anti-democratic ; communism is perhaps the chief sinner in ' pushing people about ' but the Balfour blunder that led on to the 700,000 refugees displaced from Palestine is a grim fact.

The chapter by Eric Fischer on Mittel Europa seems to concentrate on dynastic and other changes which are so largely the froth of the story. The loess area in central Europe with its very ancient rural patterns, and the penetration of Romanism eastward along it, with the clash between Rome and Constantinople creating the predecessor of the modern Iron Curtain, could have been brought in to show the deeper political factors involved.

The difference in tradition between Spain with its grandees and Portugal with its more commercial outlook could have been stressed more clearly. Portuguese say that, landwards, they are separated from civilisation by Spain. In studying Latin America, Preston James, as one would expect, argues skilfully about the differences between these two traditions in their action in Brazil and Spanish America.

A chapter on the Union of South Africa is of great value. Theoretical policies of Apartheid are in conflict with economic tendencies towards increased urbanism and tend to work out as " Good jobs for rather poor whites and poor jobs for rather good blacks ", while the term ' coloured ' covers an almost infinitely graded series inextricably interwoven. Tribalism is decaying under modern conditions, and migratory labour accelerates this decay as well as widespread social disintegration.

The twentieth-century development of Canada into almost a major power through utilisation of local mineral resources is a major change not always realised ; it is to some extent subject to investment in Canada of U.S.A. surpluses, but the happily unguarded frontier makes this less disturbing than if that frontier were military. It points to the importance of close links betewen U.S.A., Canada and Britain, and Australia and New Zealand too. Neither Canada nor Australia nor New Zealand wishes for more than a gradual and selective increase in population in spite of defence problems, and New Zealand is thus the more likely to be an air-base for U.S.A. in a crisis, perhaps Australia too.

Exploitation of world resources is slowly giving rise to conservation safeguards which are likely to make national frontiers more and more serious. In U.S.A. they will probably tend to increase federal power rather than that of the forty-eight states. They make offshore waters increasingly national and we have here the famous case of the 200-mile belt off Peru. The national frontiers in Antarctica may soon be of economic as well as of exploratory importance. Appropriately, the book ends with Dudley Stamp's solemn warnings about population problems.

[1] *The Changing World.* Studies in Political Geography. Edited by W. Gordon East and A. E. Moodie. 9×6¼. Pp. xi×1,040. 139 figures. London : George G. Harrap & Co. Ltd, 1956, 42s.

REVIEWS OF BOOKS

EUROPE

The Soils around Jedburgh and Morebattle. By JOHN W. MUIR. 9¼×6¾. Pp. 878. 2 maps. 20 tables. 11 diagrams. 32 plates. 8 colour plates. Edinburgh: H.M.S.O., 1956. 30*s.*

This descriptive memoir accompanying sheets 17 and 18 of the Soil Survey of Britain covers that area in the south of Scotland drained by the river Teviot and its tributaries—an area some 450 square miles comprising "the greater part of Roxburghshire, the south-eastern part of Selkirkshire and the north-eastern tip of Dumfriesshire". The format of the memoir follows closely the lines of the first and preceding publication dealing with sheets 86 and 96; a description of the soil associations and their constituent series is preceded by a general introduction to the physical background of the area, an explanation of the terms and methods used, and an analysis of the factors affecting the formation and the distribution of soils in this particular area. This leads to a certain repetition of material already provided in the first memoir, despite a slightly different arrangement and emphasis. One looks forward to the production of a separate and comprehensive glossary of soil terminology: it would be an invaluable guide to those wishing to utilise the findings of the Soil Survey and would also help to clarify any differences in the use of terms by this body and others, such as the Geological Survey.

The latter part of the memoir contains excellent chapters on the agriculture (H. H. Corner), the vegetation (E. Wyllie Fenton) and the forestry (W. N. Gibson) of the area and on analytical data. Also, in addition to numerous black and white plates, there are eight colour plates of soil profiles.

While one must commend the addition of a cross section, showing the relation between soils and relief, to each map, one must deplore the lack of foresight in the production of a separate map sheet for the Morebattle area which occupies less than one-sixth of the sheet and in the use of the political boundary as the dividing line between the Scottish and English Soil Surveys. Why not in view of the basis of classification use a geological boundary? One can only hope that the eventual mapping of the Merse of Berwick will not be sacrificed on the altar of nationalism

J. T.

The British Moorlands: A problem in land utilisation. By JOHN FRASER HART. 8½×5½. Pp. viii+98. 25 figures. University of Georgia Monograph, No. 2. Athens (U.S.A.): Georgia University Press, 1955. $2.00.

The aim of this short monograph is, in the words of the author, "to analyse the optimum utilisation of the British moorlands in terms of the present necessity for maximum terricultural production". It is, in fact, a general résumé of the principal physical, historical and economic characteristics of the rough grazings of Highland Britain illustrated by specific examples of hill farming and forestry in Wales, Northern England and Scotland. As such, it will undoubtedly provide the American student with a reasonably comprehensive study of one of the principal types of land utilisation in Britain.

The balance between detail and generalisation is, however, not always satisfactorily maintained. The latter, particularly in the analysis of the physical environment, has produced some very questionable statements while the consideration of the problems of moorland agriculture and improvement is at times over-simplified; this combines unhappily with a style that too often verges on the pretentious. The maps and diagrams are clear and neat, though one can find little justification for the production, on five separate occasions, of the *same* map showing the distribution of moorland, heathland and rough grazing in Britain and a full-page block diagram which has, apart from an indication of scale, no other blemish than the title, "A selected area in Highland Britain".

J. T.

European Refugees: A Study in Forced Population Movement. By MALCOLM J. PROUDFOOT. 5½×8½. Pp. vi+542. 49 tables. 2 maps. London: Faber & Faber Ltd, 1957. 52*s* 6*d*.

A number of studies of forced population movements in Europe have appeared since the end of the war. Few have, however, been as comprehensive or as impartial as Malcolm Proudfoot's *European Refugees*. This tremendous movement of population, estimated by the author to have affected sixty million people, is reviewed from the angle of refugee relief and rehabilitation. The author pays particular attention to the analysis of government policies and their influence upon a lasting settlement of the problems created. The book may well be regarded as a guide to the solution of refugee problems based on experience gained in " a dress-rehearsal for a tragic drama not yet begun ". At the present time it certainly ought to be made essential reading for anybody concerned with the Hungarian refugees. The surveys of wartime escape routes and of Jewish migration to Israel are particularly valuable. The treatment of the German refugee problem is, however, a little superficial and the author treats the long-term effects of this movement upon European life in a manner that leaves the reader thirsting for more. He places a little too much emphasis on the E.C.A. Technical Assistance Commission on the Integration of the Refugees in the German Republic: the Federal German authorities recognise that " self-help " has been one of the largest factors in refugee rehabilitation. It is also a pity that the author does not cast any new light on the use of German and other technicians after 1945 in the Soviet Union. Indeed the treatment of European forced migration into the Soviet Union is essentially a superficial one. Extensive reference to sources is provided and there is a large amount of statistical material in tabular form. The presentation of some of this material in map form would undoubtedly have aided in its digestion. Much of this material and the long quotations and copious extracts from official documents at present sprinkled through the text might well have been gathered in the appendices to the benefit of the readability of the text and the appreciation of Proudfoot's thesis of the need for careful co-ordination and consistent policy in refugee affairs. R. E. H. M.

East Norway and its Frontiers. By FRANK NOEL STAGG. 8¼×5¾. Pp. 285. 15 plates. 6 maps. London: Allen and Unwin Ltd, 1956. 18*s*.

This is the fourth of Commander Stagg's ' regional histories ' of Norway. It covers the provinces of Oppland, Hedmark, Akershus and Østfold, and thus includes not only Oslo and the industrial districts of the south-east, but also the two great routes to the north—Gudbrandsdal and Østendal. This region is one of the few natural meeting-places of Norwegian, Swede and Dane; consequently conflict between them plays an important part in its history. Equally, however, commercial contacts with the European mainland and Britain have played their part from the early days of trade in timber and naval stores to the present time. Commander Stagg's interpretation of history includes both economic and social aspects as well as political; his book shows clearly a vast knowledge of the country and its literature and contains much material of value to the geographer. Moreover, it is eminently readable and concise. It contains clear but simple sketch-maps of the site of Oslo, of the south-eastern frontier and of each province; unfortunately, but understandably, these lack any indication of relief. Altogether this is an intelligent man's guide to East Norway in the very best sense. H. A. M.

La Yougoslavie: Aperçu Géographique. By B. Z. MILOJEVIC. Translated by MILA DORDLVIC. 9¼×6½. Pp. xi+89. 1 folded end map and numerous figures and plates. Beograd: La Commission pour les relations culturelles avec l'étranger, 1956.

This is a convenient summary of the geography of Yugoslavia. It embraces chapters on relief, climate, vegetation, economic, human and political geography and the political organisation of the Yugoslav state. Several sketches of typical land-forms and settlement types, together with a good folding map and some—badly reproduced—photographs, are also included. R. H. O.

ASIA

The Pakistani Way of Life. By I. H. Qureshi. 8¾×5¼. Pp. xi+81. 23 plates. London : William Heinemann Ltd, 1955. 12*s* 6*d*.

Mr Qureshi's book gives a restrained account of the major sacrifices that were made to secure freedom from India, enumerating such items as a million deaths and 7 million refugees (probably a conservative estimate), but says little of the lesser inequalities of a partition which left the newly born Pakistan without even the beginnings of a foreign consular service, as the existing offices in other countries all went to India.

The harrowing experiences of mass migration have produced in the Pakistan public an active political consciousness, but the author sagely observes that this is not the same thing as political maturity. Muslim migration out of India into Pakistan has not yet stopped and a trickle continues, sufficient to keep alive the bitterness of the ' Displaced Person ', and to be a grave anxiety to government. There is also the frustration of the long-continued ' cease-fire line ' which divides Kashmir into two very unequal parts, the larger being held by Indian troops. It is sad that this remains an open sore in the national consciousness as it forms the only kind of national antipathy. Apart from this, the Pakistani exhibits a singular lack of prejudice against all foreigners. Frequent attempts to canvass international opinion on this subject of the Hindu occupation of a Muslim Kashmir have however met with singularly little response from the outside world, including Britain, whom the Pakistanis naturally suspect of pro-Hindu collusion towards a partition of Kashmir.

Qureshi has little of good to say of the educational system which was established during British rule and which according to him was frankly to create an army of clerks and petty administrators, but never seriously undertook the task of creating a new nation. Pakistan therefore needs a new system which will bring about a reconciliation between secular and religious knowledge and which will " create traditions of scholarship and research integrated with the ideology of Islam ". This is a brave slogan in view of the over-crowding in schools and colleges.

There is also the familar tilting against Britain for having established an aristocracy of landlords out of their tax-collectors. I would agree more readily with his other statement that corruption and inefficiency received an impetus during the last war through the weakening of the administrative machinery, and the subsequent disastrous dislocations of the partition period. The present administration is of a senate and a lower house for the whole of Pakistan ; in these the Muslim League domination has been seriously reduced in recent elections. The provincial bodies are now reduced to one each for East and for West Pakistan. The rulers of states have been pensioned off and have no part in the administration now.

One sympathises also with the writer's differentiation between the two categories of thought—on the one side the Buddhists and Hindus with a trend of mind speculative and conservative ; on the other the Muslims, the Christians and the Jews with a more rational, practical and progressive outlook.

The author does not deal at all fully with the wonderful industrial renaissance which Pakistan has staged during its first eight years as a separate nation. Anyone looking for details of this nature should consult the *Journal of the Royal Society of Arts* CIV No. 4978 of 25-5-56, which contains a lecture by Mr Mohamad Ikramullah giving much valuable data. R. MacL. G.

Indian Climatology. By S. B. Chattergee. 9½×6¼. Pp. 417. 36 tables. 80 diagrams. Calcutta : Commercial Printers, 1955. 20*s*.

This book consists of a number of articles published in the *Calcutta Geographical Review* and elsewhere about 1950-51 together with several specially written chapters. It incorporates the work of " nearly ten years laborious research on some specific climatological problems of India with special reference to the monsoons ". A major drawback is the large amount of repetition due to the manner in which the book has been written.

Much of Dr Chattergee's treatment of climate involves higher mathematics and

advanced statistical methods, but for the non-geographical reader its numerous distribution maps, though small, should be of considerable value. Many interesting ideas are expressed, some already well-known, others more novel, but the book is handicapped by the author's verbosity, his long sentences (one of some 200 words), his frequent use of jargon and occasional words coined by himself. These features are particularly noticeable in the long first chapter which consists of a series of brief résumés of the following chapters.

Chapter 2, ' General Methods in Climatology ', deals with the statistical methods he used in trying to delimit such features as the areas affected at different seasons by oceanic and continental air masses. There follows, in Chapter 3, two articles on ' Precipitation characteristics ' and, in 4, a discussion on classification. The book concludes with a chapter entitled ' Climo-statistical Regions ' and with several short articles on the Indian monsoons, the mechanism of the weather in India and a chapter on synoptic applications and conclusions. C. P. S.

Asia : Sketch Map and Exercise Books for upper forms. Book VII. By THOMAS PICKLES. 7¼×9¾. Pp. 48. London : John Murray Ltd, 1956. 3*s*.

Here is a work which can help the school-teacher to persuade the pupil that maps are as significant and necessary to regional understanding as verbal description and annotation. Simplicity and clarity are characteristics of this geographer's works. He is probably better known south of the border and has undoubtedly, in this compact and voluminous sketch-atlas, kept his usual incisive line and crisp delineation of essentials.

Certainly, the Middle East and the Sub-Continent are generously and interestingly discussed. Perhaps the days of the Test Map are passing and these items seem a little clumsy in comparison with the purely expository sections. N. S.

AMERICA

The Industrial Structure of American Cities : A geographic study of urban economy in the United States. By GUNNAR ALEXANDERSSON. 10×7½. Pp. 134. 40 figs. 13 maps. London : Allen and Unwin Ltd, 1956. 40*s*.

This work is interesting, not only as a study of industrial location in the United States, but for its methodological approach to the functional and structural differentiation of manufacturing cities. The author, who was familiar, through assisting Professor William-Olsson in the preparation of the latter's Economic Map of Europe, with the difficulties of comparative study of the heterogeneous European statistical material, decided to apply similar methods of urban industrial analysis to a single country with a wide but homogeneous statistical base. As the author says, the research, while not deliberately aimed at specific planning problems, may help to answer questions such as : what industries are usually associated ? What are the city-forming or population-agglomerating as distinct from the city-serving industries ? The basis of the work is a statistical analysis into 36 industrial groups of the gainfully employed urban (*i.e.* locally employed) population. Each map of a particular industry is accompanied by a cumulative distribution diagram showing the percentage of population employed in that industry in each decil (10 per cent) of the 864 cities with 10,000 or more inhabitants in 1950. Most manufacturing industries belong to the sporadic type, employing over 20 per cent of the population in a few cities, while most service industries except medical, education, public administration and railways, are ubiquitous, with relatively small differences between cities in the first and tenth decils. Construction, food processing and printing also fall into the ubiquitous group. An appendix provides a useful list of the city-forming industries in the 864 cities. For each city the industries are classified (after subtracting the minimum city-serving structure taken at 5 per cent from the origin in the cumulative distribution diagram) according as they have 5·0-9·9, 10·0-19·9 and 20 per cent or more of the gainfully occupied population.

C. J. R.

CARTOGRAPHY

Topographical Maps and Photographic Interpretation. By P. T. Silley. 9½×6½. Pp. vii+76. 8 maps with 8 plates. 3 plates. 53 figs. London: George Philip and Son Ltd, 1955. 10*s* 6*d*.

This book is intended primarily for pupils of Senior Secondary Schools and also for candidates preparing for Civil Service examinations, but it will nevertheless be found useful in the work of university students.

The work falls into two main sections which deal with topographical maps and the interpretation of aerial photographs. The section concerning the interpretation and use of topographical maps is treated in a manner similar to that used by other authors in such studies. A simple and straightforward systematic treatment is given under the usual headings of, for example, 'Scale', 'Methods of Showing Relief', etc. One would, however, like to see greater attention drawn to the existence of modern Ordnance Survey maps such as the 1-inch 7th Series.

It is in the following section, which treats of the use which can be made of air photographs that the author makes his most important contribution. This part of the book prepares the student for work with both vertical and low oblique photographs. Here little previous knowledge of the material is presumed, but the reader is quickly initiated to the task of interpreting photographs by a simple text, very suitably and generously supplemented by diagrams.

At the end of the book there is an excellent section which 'marries' the two previous ones. This concluding section contains a number of photographs together with maps on various scales which, used in conjunction with a detailed series of analytical questions, tests the reader and enables him to ascertain whether he has achieved the aim of the book.

The book itself is well-presented and amply provided with illustrations which are clearly drawn and well placed in the text. I. J. K.

Map and Photo Reading. By T. W. Birch. 10×7½. Pp. 64. 24 maps and photos. London: Edward Arnold and Co., 1956. 16*s*.

This book, together with the separate answer book which supplements it, provides what is described in the sub-title as "a graded course" in map, aerial and ground photograph reading. Its value lies chiefly with the school teacher who will find, in the exercises which comprise it, an almost complete series of testing questions.

The exercises are graded into four sets according to ability and stage of instruction of the pupils. This method means that each map or photograph is used several times over at different stages of instruction. The result of such a systematic method can only be one of familiarity with the subject. The subjects of each exercise are well-chosen maps or photographs. These maps are all excerpts from Ordnance Survey sheets and so are easily obtainable and familiar to the teacher for continued work in the subject. Photographs are perhaps not so readily available but the author chooses his examples well and uses vertical, oblique aerial and ground photographs as material for the exercises. The scope of subject matter is wide and ranges from coast to inland districts and from low-lying fen to Cairngorm summit. Cultural subjects are also fully dealt with both in maps and photographs. The wide range of scales of Ordnance Survey maps used is a very welcome feature as the range lies between 25-inch plans and 1-inch maps. Specimens from the 7th Series 1-inch and latest edition of 6-inch maps are included so that the teacher or pupil cannot feel that he is dealing with out-of-date material.

The book is concluded by the inclusion of sections on the manipulation of the National Grid system, model making, reducing and enlarging, section drawing and the preparation of descriptions both from maps and from field observation. These sections are well-composed and follow a very practical pattern. One would like to see the sections relating to the preparation of descriptions of areas from field observation and map study expanded, however, as this aspect of map-reading is too often left aside and seldom treated with sufficient imagination. It is also unfortunate that there is no section devoted to the study of scales. One would like, perhaps, to have seen a bibliography, or at least a note of useful books included in the contents of this book.

The book does, however, generally achieve its object in providing a carefully chosen series of graded exercises which should stimulate both teacher and pupil to a further study of map and photograph reading both in the classroom and in the field. I. J. K.

Mapping the World. By ERWIN RAISZ. 6½×9½. Pp. 112. 72 figs and 7 plates. London: Abelard-Schuman, 1956. 12*s* 6*d*.

Professor Raisz has already in his *General Cartography* given the advanced student a work of value and significance. His intention in this attractive book is to compel young people to share his enthusiastic interest in cartography. The book is attractive, both in its format, and in its fine blend of simplicity and scholarship. The historical progression from the primitive earth—portraits of Arab and Greek, onwards to air-photography, is the essential scheme. And Professor Raisz has succeeded in making his complex subject dramatic and intelligibly obvious as both science and history.

One of the disturbing aspects of a teacher's University studies is that the fine outlines of his subject often blur under the microscope of specialised attitudes. Such a work as this, can reveal again the sweep and majesty of man's attempts to create the map, the globe and the chart.

The line drawings are sweet and firm. There is none of that distressing attempt to make them neither artistic nor realistic which deforms so many American books. School-children will respond to this book with pleasure and profit. N. S.

GEOLOGY AND GEOMORPHOLOGY

Introduction to Physical Geology. By CHESTER R. LONGWELL and R. FOSTER FLINT. 9½×6½. Pp. vii+432. Plates and figs. 2 end paper maps. London: Chapman and Hall Ltd, 1955. 40*s*.

This is an extremely well-illustrated book which should prove acceptable to a wide range of readers. The text is clear and balanced, so that themes do not become confused, whilst the technique of using sensible 'case histories' in the exposition is commendable. R. C.

Geology and Ourselves. By F. H. Edmunds. 9½×6½. Pp. 256. 12 plates. 15 figs. London: Hutchison's Scientific and Technical Publications, 1955. 21*s*.

In setting out to discuss "the economic use of geology" the author has divided his book into two parts, the first dealing with the nature and content of geology and the second covering its relationship to water supply, building materials, engineering, mining and agriculture. Thus designed and well-illustrated the book appears attractive not only to the layman for whom it is primarily intended, but also to the professional.

It is difficult, however, not to be disappointed by this work. The early chapters dealing with rocks and fossils and the history of the earth must frequently bewilder the beginner, and the later chapters on economic aspects are too general to satisfy the professional. Major omissions are rather too numerous as, for example, the absence of any reference to the appearance of different building stones, and a disproportionate amount of attention is given to the sedimentary rocks of S.E. England. Geomorphology receives scant attention and is relegated to the last chapter entitled "Geology for the Amateur".

The conception of this book is undoubtedly good but in effect too much has been attempted in too brief a space. Its superficial character suggests that the author might well have dealt exclusively with the practical applications of geology.
D. R. M.

Der Bodenfrost als Morphologischer Faktor. By JOSEF SCHMID. 9½×7½. Pp. viii+144. 27 figs. 5 plates. Heidelberg: Dr Alfred Huthig Verlag, 1955.

In this book the author describes and discusses experiments on the effect of frost on soils near Mainz under varying conditions of slope, exposure, altitude, ground water and vegetation, during the years 1949-54. By measuring the heaving of the soil surface caused by frost, he had endeavoured to assess on a quantitative basis the role of frost in moulding the landscape today. His experiments included the measure-

ment of expansion of soil samples in closed vessels and in their natural position. The results emphasised the importance not only of the duration and intensity of the frost but also of the amount of ground water available and the nature of the soil particles. Under favourable conditions the soil surface can be raised as much as 16 mm. on freezing while on slopes the upper few centimetres of the soil even under trees can creep downwards by 10-15 mm. in a single winter. The cumulative effect of such movement must be very great and leads the author to question the widely-held view that there has been little or no modification of the landforms by frost action since the close of the Ice Age. He insists on the universal importance of this " dry " frost heaving as a morphological factor compared to the solifluction of waterlogged soil and the growth of needle ice (pipkraks of some authors), both of which he regards as phenomena limited to places where ground water is exceptionally abundant.

While the author has done much to elucidate the mechanisms of frost heaving in temperate latitudes, he is less happy when considering the structural soils of Arctic regions, and falls back on deductive reasoning largely because quantitative data is lacking. The extensive bibliography covers works in German mainly and many important works in other languages are not mentioned.

Despite these criticisms, the author is to be warmly congratulated on extending our knowledge of one of the most important processes of erosion and pointing the way to further quantitative studies. It is an indication of the immense field available that he has been able to carry out work of great scientific value with most rudimentary apparatus.

R. W. G.

Vocabulaire Franco-anglo-allemande de Geomorphologie. By HENRI BAULIG. 9¼×6¼. Pp. xxv+230. Publications de la Faculté des lettres de l'Université de Strasbourg. Fasc. 130. Paris: Société d'edition: Les Belles Lettres, 1956. 1,200 *fr.*

There can now be no excuse for misunderstanding between West European and English-speaking students of landforms. Professor Baulig's book entirely supersedes the few special dictionaries at present available, being in a unique way a dictionary, a classified vocabulary, an explanatory text book and also almost a history of the development of geomorphology so far as it is based on terminology. And since it is this aspect of the study that so often antagonises those to whom it should be of most value this book is more than welcome.

Professor Baulig entirely disarms criticism in his introduction and provides no uncovered targets in his text. In over five hundred paragraphs, served admirably by a trilingual index occupying nearly a third of the book, he incorporates the appropriate English and German expressions into an explanatory French text, often giving the names of their originators, frequently the dates of their introduction and often the sources of words not native to these three languages. Dealing with perhaps four thousand meanings and two hundred authors, the text itself is a model of exposition, stressing the processes of erosion and the forms they produce before considering their field of action and its modifying effects.

The level of treatment is such that new contributions are made to the discussion of the simplest terms, new terms are suggested for languages not possessing the appropriate synonyms and very relevant but often humorous quarrels are picked with the many inconsistencies of nomenclature and usage. And yet with suitable selection of the numbered paragraphs by the teacher the book could be used for sixth-form work at school. Surely this is the most comprehensive and yet particular and characteristic service that we could receive from the doyen of physical geographers.

C. A. H.

ECONOMIC GEOGRAPHY

World Economic Geography. By EARL B. SHAW. 8¼×6¼. Pp. vii+582. Maps, diagrams and plates. New York: John Wiley and Sons Inc. London: Chapman and Hall Ltd, 1955. 52*s.*

This new college text-book is sub-titled ' Four Approaches to an Understanding of Geonomics '. The latter term is taken to be synonymous with Economic Geography,

although one might have wished for a discussion of the usefulness and validity of this term.

The four approaches here considered are 'regional' (illustrated by a regional treatment of the economic geography of Guatemala), 'activity' (the commercial corn and mixed farming of the American Corn Belt), 'commodity' (a study of rubber), and 'principles' (as illustrated by the economic geography of minerals). These four chapters are intended to display the main methods of study open to the economic geographer.

These chapters are followed by others of a more orthodox character dealing with forestry, domestic animals and fishing. Nine of the remaining twelve chapters are devoted to agriculture in the leading natural regions of the world. These give a useful account of the varying agricultural geography of the world and also conclude with a general appraisal of the likely economic future of the major natural regions and their components. Only one chapter each is given to manufacturing, trade and population, with the result that such an important topic as electric power is not treated at all. The author himself admits that there may be objections to this modest representation of the non-agricultural aspects of economic geography. In fact he admits that the book is not intended to be exhaustive. The main purpose lies in an emphasis on principles (illustrated by suitable examples) and upon the inter-relationship of physical and human factors, together with "an inclusion of sufficient factual material . . . to provide the student with a general knowledge of geonomics".

The book is attractively produced and contains many photographs and maps as well as a bibliography at the end of each chapter. For these reasons, as well as for its interesting treatment of the subject, it may profitably be consulted by student and teacher, although the acknowledged deficiencies in coverage admittedly detract from its usefulness as a standard introductory text. R. H. O.

Chisholm's Handbook of Commercial Geography. Re-written by L. DUDLEY STAMP and S. CARTER GILMOUR. 15th Edition. 8¼×6. Pp. viii+915. 30 maps and diagrams. London: Longmans, Green and Co. Ltd, 1956. 70*s.*

The continued popularity of this work is shown by the fact that the latest edition follows so closely on the heels of the previous edition.

Although the book remains largely unchanged, leading political developments have been noted, some new statistics have been inserted and there is a new map of currency areas. R. H. O.

La Pêche maritime et le Pêcheur en Mer. By AUGUSTE DUPOUY. 6½×4¼. Pp. 216. [Collection Armand Colin, No. 300.] Paris: Librairie Armand Colin, 1955. 250 *fr.*

The addition to that useful series, *Collection Armand Colin*, of an account of sea fisheries in the widest sense will attract the student of economic and human geography, and also the landlubberly reader whose ignorance of, or indifference to, a subject of vital interest the author seeks to dispel. A wealth of information on fisheries and fishermen has been rendered palatable and assimilable. This little book is not merely an outline of the nature and techniques of maritime harvesting in different latitudes and times, and a discussion of marketing and utilisation of sea products. It is a sensitive appreciation of the reaction induced by his occupation upon the fisherman's *sens du métier*, upon his character and every-day life, and upon his dependants and other members of the coastal community.

The selected bibliography is necessarily restricted to original publications and translations in the French language. A few statistical tables (1949-1952) are also appended. J. H. K.

GENERAL

A Concise Glossary of Geographical Terms. By J. C. SWAYNE. 6¼×4. Pp. 164. London: George Philip and Son Ltd, 1956. 6*s* 6*d*.

Mr Swayne has compiled a most useful glossary. By rigidly excluding standard 'dictionary words', where possible, it has been kept within manageable limits; this in itself is a virtue. In addition a short list of common elements in British place-names, a table of stratigraphical names, a simple classification of the rocks and the Beaufort Scale, are included as appendices.

Any compiler of such a work lays himself open to glib criticisms, and it would be easy to pick a few entries for destructive comment. Could any two persons define "over-population" in precisely the same manner. It is encouraging to find "dip slope" and "back slope" separately distinguished, but the definition given in the former as "the gentle slope of a cuesta" appears not essentially different from that of the latter. Surely, if "dip slope" can be applied at all usefully, it must be restricted to slopes parallel to dip? More serious perhaps, since less excusable, are the vague and inadequate definitions of "croft" and "crofting" and the omission of "crofting counties".

The gratifying thing, however, is that so few of the definitions can be seriously challenged. The compiler has used and acknowledged the work of the Geographical Glossary Committee of the R.G.S. and other recognised authorities. Altogether this is a little book of real value to students and teachers alike and the publishers are to be complimented on producing 164 pages at such a modest price.

H. A. M.

Worlds Beyond the Horizon. By JOACHIM G. LEITHAUSER. Transl. by Hugh Merrick. 9½×6. Pp. 371. 46 plates+frontispiece. London: Allen and Unwin Ltd, 1956. 40*s*.

This enjoyable book is an account of geographical discovery over the centuries in which the author has "tried to present it in such a way that the events are pictured exactly as they occurred". Fullest treatment is accorded to the great age of discovery, more than half of the book being devoted to the sixteenth century and everything before Columbus disposed of in a sketchy introduction. But the author is not exhausted by the heroic age: there are admirable accounts of the French in North America, of the second unveiling of South America in the eighteenth century by La Condamine and Humboldt, of African exploration—the German explorers are given due credit, but most space goes to Mungo Park, Stanley and Livingstone—and even of discovery as recent as Admiral Byrd's in the Antarctic. One is inclined to raise one's eyebrows on finding the final chapter to be an enthralling discussion of space travel! Nevertheless it must be admitted that this harmonises with the main body of the work, and it certainly adds to the enjoyment of the reader.

The presentation might be described as popular, though the book is far more valuable than mere light reading. An unaffected narrative style is amplified by effective quotations—for example good use is made of the journals of Columbus and of Captain Scott—and by a judicious selection of illustrations both contemporary and modern. The best passages, indeed, are those describing individual expeditions such as Stanley's voyage down the Congo. But a firm background of reference to contemporary life and the state of geographical knowledge is maintained. The author has a detailed practical knowledge which contributes much towards his aim.

The author, however, does not make clear what has been omitted, and this over-

simplification is particularly aggravating in the case of Asia, which he has not attempted to treat fully on the argument that this was always a known land. Indeed there are no references of any kind, to material used, omitted, compared, etc., except in the course of the text. It is obvious that original records have been consulted, but the book loses most of the value it might have had for the student by their absence. Nor is there much attempt to treat controversial questions. Remembering the author's aim to present discovery to the general public, however, these criticisms are less serious.

It seems a pity that more attention was not paid to the spelling of Spanish names since they play such a vital part. Luquez for Lluque, or Santagel for Santangel might be forgiven, but hardly the misspelling of a leading conquistador with Simenez de Queseda for Ximenez de Quesada! There are other errors too, such as calling Baffin Bay " Hudson Bay " on the sketch-map on page 288, or the Siberian steppe, " stretching five thousand miles from the Amur to the Caspian Sea ". On the whole, however, the standard of accuracy is high, the detail good. *Worlds Beyond the Horizon* could not be compared as a reference book with, for example, Professor J. N. L. Baker's standard *History of Geographical Discovery and Exploration* ; on the other hand, Herr Leithauser as given to us by Hugh Merrick is very readable. A. J.

A Guide to Earth History. By RICHARD CARRINGTON. 8½×5½. Pp. xvi+240. 44 figs. 16 plates, including coloured frontispiece, by Maurice Wilson. London : Chatto and Windus Ltd, 1956. 21*s*.

To condense within one volume of moderate size the history of the Earth from origin to present day, and with special reference to the succession of its inhabitants, is a very considerable *tour de force*. To present this narration clearly and attractively, for readers without previous knowledge of any branch of science, is probably an even more remarkable achievement. Interest in this book is enhanced by the illustrations and by a selected bibliography containing over one hundred and sixty references.

The first part of the text is a prologue dealing with the Earth in space, its origin, structure, and evolution, with evidence of the past, and with Earth chronology. The second, and largest part, is concerned with the procession of life in relation to geological eras, periods, and epochs. In the third part, the rise of mankind is briefly reviewed, and in the final chapter the author adds his personal view of the lesson to be derived from a study of the history of the Earth and of life. He is keenly aware of the need for a new synthesis of science, art and religion lest the human " be extinguished with the same tragic finality as the dinosaurs before them, without ever having perceived the true nature and significance of the universe, of life, and of evolution itself ". J. H. K.

Puzzle of the Past. By RONALD JESSUP. 12¾×9¾. Pp. 68. Illustrations (colour/black and white). London : Rathbone Books, 1956. 15*s*.

The archaeologist is no longer the moth-eaten freak giving dusty answers to cloud the issue. Television has, at least, made him obvious to us as a vital and vigorous, and often adventurous, personality.

Ronald Jessup is a practical excavator who has produced this book to excite children in his " Wonderful World ". No adult need be ashamed to read it. The style is athletic and clear. The 250 or so pictures are a delight and a revelation of what modern printing can achieve. They have strength and subtlety, delicacy and purpose. For those who insist that archaeology is an art there are stories of intuition and imaginative insight. For the scientific proponent, there is a compact and precise discussion on the techniques of critical observation and careful restoration. I do not think that the publishers are wrong when they claim this as a beautiful and intelligent publishing event. N. S.

ATLASES AND MAPS

The Oxford Home Atlas of the World. By GEOFFREY CUMBERLEGE. 10×7¾. Pp. viii+104+xxxi. London: Oxford University Press, 1955. 15*s*.

The two outstanding features of this compact, moderately priced atlas are its attractive moulded relief maps and its informative distributional maps. There are forty-two pages of the former including a fascinating representation of the Pacific Ocean, and shading and layering have been remarkably well-combined to indicate form as well as latitude. Varied and modern techniques have been applied to the thirty-one full-plate distributional maps and they are on the whole clear and artistic: the vegetation maps suffer, however, from the cramming of insets over the sea areas, and indefinite tones of grey are hardly effective on the continental maps of population density. Mineral distributions warrant better representation.

In general criticism it may be suggested that the sequence of moulded relief maps and layered maps could be improved, and that they are not used conjunctively to the best advantage. Nevertheless, this is an attractive publication that should stimulate interest and meet with a ready response. D. R. M.

Map of Roman Britain: 16 miles to one inch. Third Edition. Text 11×8¼. Pp. 43. 4 maps+Map of Roman Britain. Chessington: Ordnance Survey, 1956. 7*s* 6*d*.

Since the publication of the second edition of the map of Roman Britain in 1928, much more information has become available by excavation, field studies and above all, air photographs. The cartographical problem is consequently more complex, especially as a period of four hundred years is involved. The new map covers the whole of Britain and shows the relief in subdued colours, so that the numerous symbols show clearly. A more detailed presentation of the data has also been attempted; not only are the roads, towns and villas indicated, but also the sites of "Celtic fields", temples, pottery kilns, and in fact, each and every locality where Roman material has been found. The classification of the data has been an enormous task and the very useful introduction on Roman Britain must be read to appreciate fully the significance of the various symbols used. There is no doubt that the map is eminently successful; it is most attractive in appearance, clear in presentation, and condenses the vast literature on the subject in a form readily appreciated by those without expert knowledge. The Ordnance Survey deserves our thanks for an excellent contribution which should have a wide appeal. H. F.

Penguin Atlas. Edited by J. S. KEATS. 8×5¾. Pp. xv+156. 80 colour maps. Harmondsworth: Penguin Books Ltd, 1956. 10*s*.

With 80 maps and a very full index to accompany them, the *Penguin Atlas* presents the world in a small but effective compass. The atlas maps were prepared in Sweden and represent a fine achievement on such a small page size. Space is utilised fully throughout the atlas and there are no margins.

The maps themselves vary in scale from 1 : 145M presenting the world to 1 : 2M showing the British Isles. Maps are of three styles, which may be described as Physical, Topographical reference and Political. The Physical maps are a definite innovation in this type of atlas and are to be welcomed as such. One such map precedes each continent and shows the physical nature of the area. This is done by a system of graded altitude tints ranging from green to bright red, while depths range from white to deep blue. No indication of land below sea level is made. In addition, symbols of natural vegetation are shown in a generalised way. Unfortunately these maps show areas which are too large to be effectively represented on such small scales so that the result is rather one of over-simplification leading to inaccuracy. The colouring is also rather harsh and the overall appearance is almost crude.

The maps of topographic nature, on the other hand, are well presented and show

the usual features, both natural, such as rivers and water areas, and artificial, such as towns, railways, political boundaries, etc. The land areas are on a pale yellow background with hill shading in a brown tone giving effective but subdued indication of relief. Type is well chosen and very clearly and skilfully disposed. The whole map gives a reasonable though small representation of the area with no one element upsetting the balance of the picture. One might perhaps object to the choice of areas for detailed treatment but no doubt page size restrictions intervene here also. Political maps are found on only two occasions where the world is shown and where Europe is shown by countries in the usual way.

All the maps are prefaced by a page of uniform symbols which apply throughout the atlas. The exception to this rule being the British Isles which are dealt with in detail and which have special symbols for towns and cities.

Maps and symbols are preceded by a very full index consisting of " Fifteen thousand entries ". Cross-references are given and spelling is in accordance with P.C.G.N. convention with, in addition, several names included which adopt English traditional spelling. The end papers of the atlas are used to display key maps to show the area covered by each map in the atlas.

The atlas appears small and over-crowded but contains a large mass of information. Every inch of space is utilised. The book will be found very handy and useful, no doubt, but one wonders if it could not have been slightly larger in size, as it is already larger than the usual Penguin book. Its chief value will be to bring atlas information readily within reach of every home. I. J. K.

Oxford Regional Economic Atlas of the U.S.S.R. and Eastern Europe. Oxford : Clarendon Press. London : Cumberlege, 1956. 42s.

This, the first regional atlas to be published in this economic series, provides what is very literally a handy reference book on the U.S.S.R. and Eastern Europe. The data incorporated in the dot maps are generally for 1954. Since the map labels give data for pre-war (year unstated) and 1948-50 it seems a pity that averages were not used in compiling the maps. The large size of dot adopted has a rather crude effect in the smaller maps. A great deal of locational information is included in the industrial maps and much is also conveniently summarised in the text pages. Consultation of one set of figures on page 36 would seem to indicate that they represent not total cultivated area as stated but only tillage. Some political-historical maps are appended. C. J. R.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

PROCEEDINGS

CONGRATULATIONS : To Finlay MacGillivray and Katharine Lushington Addison-Smith on their marriage in Inverness on 17th January 1957.

OBITUARY : On 28th December 1956, John McPhail Mackinnon, Colonel, R.A.M.C. (Retd), a Member of Council from 1951-1954.

MEETINGS OF COUNCIL were held on 11th December 1956 and 12th February 1957.

LECTURE SESSION, 1956-57

The following lectures were delivered :

EDINBURGH. *Usher Hall.*—General Sir James Marshall-Cornwall, K.C.B., C.B.E., D.S.O., M.C., on " The Welsh Marches," 13th December. Guy Arnold, B.A.(Oxon), on " The Oxford University Expedition to Borneo of 1955-56," 17th January. Professor Preston E. James, M.A., PH.D., on " The Riddle of Empty Brazil,"

14th February. Professor Ronald Miller, M.A., PH.D., F.R.S.E., on "Talking of Hills," 14th March.

SPECIAL LECTURE : George Band on "Exploring the Land of the Incas," 4th March.

Central Hall.—Arthur H. Read, M.A., PH.D., on "Climbing in the Karakoram," 5th December. Professor Basil C. King, D.SC., PH.D., F.R.S.E., F.G.S., on "A Journey to the Bechuanaland Protectorate," 19th December. Benjamin R. Feaver, on "The Rockies—their Birds and Flowers," 9th January. George Reith, M.A., B.SC., B.ED., PH.D., on "Italy," 23rd January. Robert Common, B.SC., PH.D., on "So we went to Greece," 6th February. Patrick Barnes, C.A., F.R.G.S., on "A Short Visit to Tokyo and Central Japan," 20th February. Walter A. Payne, M.A., PH.D., on "Merging Cultures in Central America," 6th March. Sydney H. Jones, on "Ceylon—an Enchanting Island," 20th March.

Society's Rooms.—John K. Stager, B.A., on "New Developments in Canada," 31st January. Alex Muir, B.SC., PH.D., on "Soil Surveys and Land Developments in Africa," 21st February.

GLASGOW. *St Andrews (Grand) Hall.*—General Sir James Marshall-Cornwall, K.C.B., C.B.E., D.S.O., M.C., on "The Welsh Marches," 14th December. Guy Arnold, B.A.(Oxon), on "The Oxford University Expedition to Borneo of 1955-56," 16th January. Professor Preston E. James, M.A., PH.D., on "The Riddle of Empty Brazil," 13th February. Professor Ronald Miller, M.A., PH.D., F.R.S.E., on "Talking of Hills," 15th March.

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The Ruhl Restaurant.—Annual Lecture Lunch. Principal Guest Speaker, Major-General Douglas Neil Wimberley, C.B., D.S.O., M.C., on "A Soldier's Travels," 16th March.

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